

The United States MILLER

Volume 11.—No. 6.

MILWAUKEE, OCTOBER, 1881.

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UNDER THE PATENTS ISSUED TO JNO. STEVENS.

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License to use the machine and process will be issued by the patentee for each mill furnished by us.

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Built under their original patents until their expiration. Improvements since added, "STOP MOTION ON REGULATOR," prevents engine from running away; "SELF-PACKING VALVE STEMS" (two patents), dispenses with four stuffing boxes; "RECESSED VALVE SEATS" prevent the wearing of shoulders on seats, and remedying a troublesome defect in other Corliss Engines, "BABBITT & HARRIS' PISTON PACKING" (two patents). "DRIP COLLECTING DEVICES" (one patent). Also in "General Construction" and "Superior Workmanship."

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The ONLY WORKS where this engine can be obtained are at PROVIDENCE, R. I., no outside parties being licensed.

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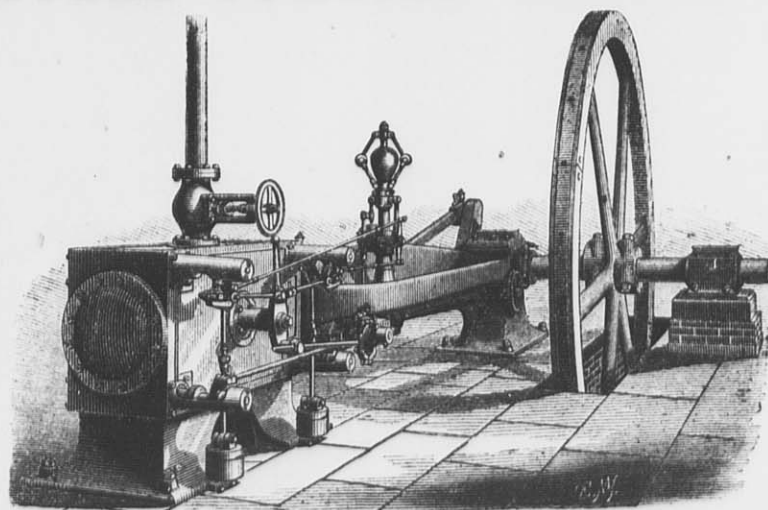


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Nickle FLOUR TESTERS mailed for 35c.

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BUILDERS OF ALL CLASSES OF

Engines and Boilers.

We build The Best Farm Engines and Small Engines for Warehouses and Elevators.

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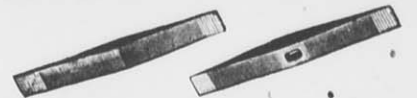
FROM 1-4 TO 10,000 LBS. WEIGHT.

True to pattern, sound and solid, of unequalled strength, toughness and durability. An invaluable substitute for forgings or cast iron requiring three-fold strength. Gearing of all kinds, Shoes, Dies, Hammer-Heads, Cross-Heads for Locomotives, etc. 15,000 Crank Shafts and 10,000 Gear Wheels of this steel now running prove its superiority over all other steel castings. CRANK SHAFTS, CROSS-HEADS and GEARING specialties. Circulars and price lists free. Address

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John W. Rogers,
MANUFACTURER AND DRESSER OF
MILL PICKS



313 Cedar St., St. Louis, Mo.

30 or 60 days' trial to any responsible miller in the United States or Canada, and if the picks are not finer and thinner than anything they ever used, there will be no charge for the same, and I will refund all express charges both to and from St. Louis, Mo. When ordering new picks state weight and kind. Send for prices before buying. References from every State and Territory in the United States.

P. S.—No Mill Pick manufacturer who does poor work can get such letters as the following:

Office of James Leffel & Co., Springfield, Ohio. {

September 9, 1880. {

John W. Rogers, Esq., St. Louis, Mo.—Dear Sir: We herewith inclose draft, \$21.85, to pay your invoice of August 9th. Please acknowledge. Yours respectfully

JAMES LEFFEL & CO.

Office of James Leffel & Co., Springfield, Ohio. {

November 16, 1880. {

John W. Rogers, Esq., St. Louis, Mo.—Dear Sir: Inclosed find bill of lading covering a shipment of mill picks made you to-day. Please dress the blades on one end and return to us at your very earliest convenience. The last lot of blades sent are giving good satisfaction. Yours truly,

JAMES LEFFEL & CO.

Office of The Williams & Orton Mfg. Co. {

Sterling, Ill., October 7, 1880. {

John W. Rogers, Esq., St. Louis, Mo.—Dear Sir: Inclosed find Chicago draft No. 85,660, amount \$44.00, in full account. Please acknowledge receipt and oblige. Yours respectfully, WILLIAMS & ORTON MFG. CO.

G. M. Robinson, Secretary.

The Nordyke & Marmion Mill Works. {

Indianapolis, Ind., September 10, 1880. {

John W. Rogers, St. Louis, Mo.—Dear Sir: We inclose our New York check No. 334 for \$72.35, in full of our account. You will please acknowledge receipt of same and oblige. Yours respectfully,

NORDYKE & MARMION CO.

Alsey Mills, Scott Co., Ill.

John W. Rogers, St. Louis, Mo.—Gents: Please find inclosed order on T. C. Taylor & Co., St. Louis, in pay for the Mill Picks, with thanks for your liberal offer to try which we have done, and take pleasure in saying that we find them a superior Pick to any we have had from Chicago or St. Louis, and will add that I have had 35 years experience in milling. J. J. HAYCRAFT.

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Boots, Shoes, Coats, Cloaks, Gloves, Combs, Balls, Dolls, Bands, Hats, Penholders, Inkstands, Door Mats, Door Springs, Toilet Sets, Horse Covers, Wagon Covers, Plant Sprays, Umbrellas, Toilet Sets, Belting, Packing, Hose, Mirrors, Sheetting, Diapers, Syringes, Tubing, Brushes, Jewelry, and everything else made of Rubber

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372 and 374 East Water St., MILWAUKEE, WIS.

The only store in Wisconsin or Minnesota connected with Goodyear Rubber Co., New York.

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Amsterdam, Netherlands, Europe.

American Flour a Specialty.

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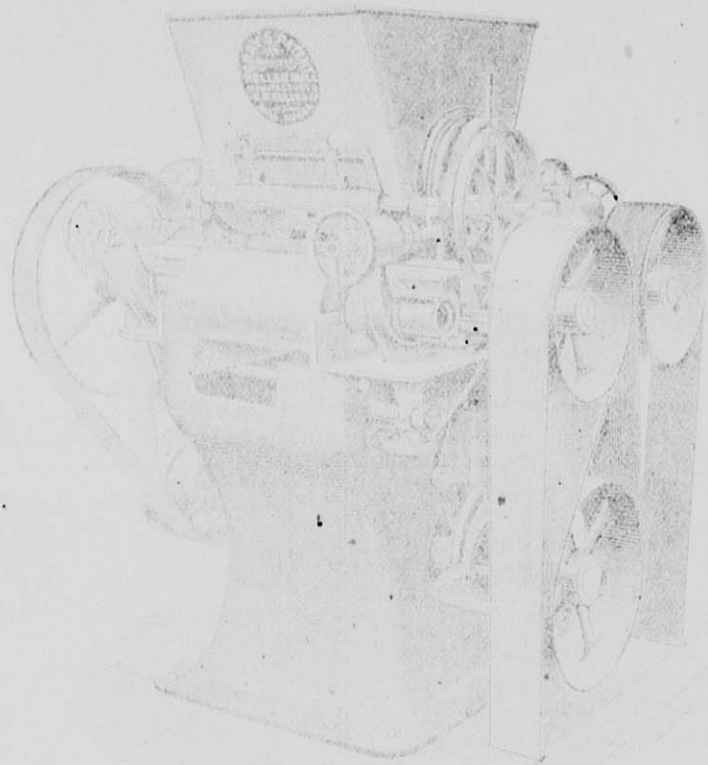
David & Carl Simon,
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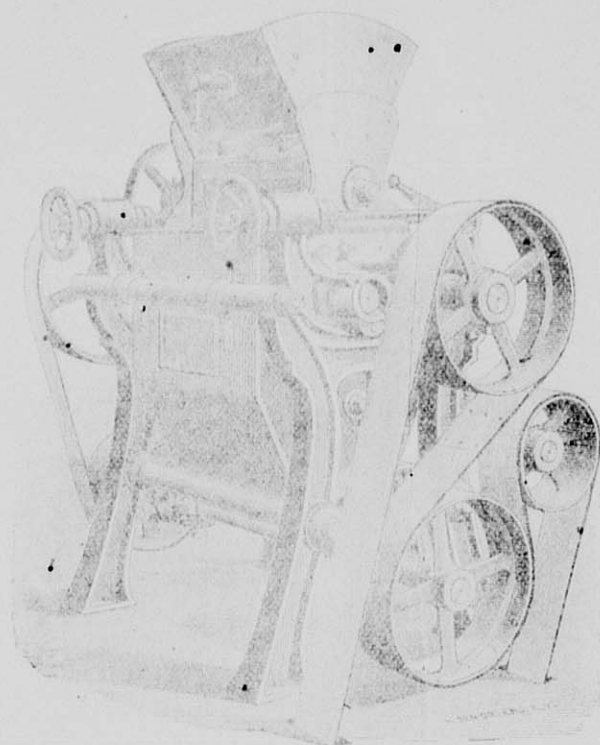
For the Sale of Flour and Grain.

Grain shippers' agency solicited. Liberal terms on consignments. Highest references. [Mention this paper when you write us.]

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DOUBLE MACHINE



SINGLE MACHINE

WITH

Corrugated Chilled Iron Rolls.

CORRUGATIONS CUT OF ALL DESCRIPTIONS.

OVER 5,000 IN USE!

First Premium Awarded at Millers' International Exhibition

These machines require little power, are perfectly noiseless, being driven entirely by belt; are simple in construction; strong and durable; perfect in every adjustment; adapted to both soft and hard wheats.

We refer to the following prominent millers who are each using from 50 to 150 of these machines:

Winona Mill Co., Winona, Minn.
C. A. Pillsbury & Co., Minneapolis, Minn.
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Washburn, Crosby & Co., " "
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Sidle, Fletcher, Holmes & Co., " "
E. V. White & Co., " "
John Glenn, Glasgow, Scotland.
Jones & Co., New York City.
Geo. V. Hecker, New York City.
Becker & Underwood, Dixon, Ill.
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E. T. Archibald & Co., Dundas, Minn.

Jesse Ames' Sons, Northfield, Minn.
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L. H. Gibson & Co., Indianapolis, Ind.
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LaGrange Mill Co., Red Wing, Minn.
Waggoner & Gates, Independence, Mo.
Horace Davis & Co., San Francisco, Cal.
And hundreds of others.

To all parties purchasing our rolls, we give full information regarding the system of Roller Milling.
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EDW. P. ALLIS & CO.,

Milwaukee, Wis.

The United States MILLER

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MILWAUKEE, OCTOBER, 1881.

Terms: \$1.00 a Year in Advance.
Single Copies, 10 Cents.

Hints to Users of Belting.

1. Horizontal, inclined, and long belts give a much better effect than vertical and short belts.
2. Short belts require to be tighter than long ones. A long belt working horizontally increases the grip by its own weight.
3. If there is too great a distance between the pulleys, the weight of the belt will produce a heavy sag, drawing so hard on the shaft as to cause great friction at the bearings; while at the same time the belt will have an unsteady, flapping motion, injurious to itself and to the machinery.
4. Care should be taken to let belts run free and easy, so as to prevent the tearing out of lace holes at the lap; it also prevents the rapid wear of the metal bearings.
5. It is asserted that the grain side of a belt put next to the pulley will drive 30 per cent more than the flesh side. Experience can alone verify this, but when the belts are required to be worked this way the fact should be stated in the order, so that the riveting may be arranged accordingly.
6. To obtain a great amount of power from belts, the pulleys may be covered with leather. This will allow the belts to be run very slack, and give 25 per cent more durability.
7. Leather belts should be well protected against water, and even loose steam or other moisture.
8. Belts working in very wet places should be ordered to be water-proofed.
9. A careful workman will see that his belts are redressed about every four months, by sponging the dirt from them with warm soap and water; then drying with a cloth, and while still damp, rubbing in castor oil or curriers' grease, which will be readily absorbed, the leather being moist from washing. Castor oil has the additional advantage of preventing rats attacking the leather.
10. In putting on a belt, be sure that the joints run with the pulleys, and not against them.
11. In punching a belt for lacing, it is desirable to use an oval punch, the larger diameter of the punch being parallel with the belt, so as to cut out as little of the effective section of leather as possible.
12. Begin to lace in the centre of the belt, and take care to keep the ends exactly in line, and to lace both sides with equal tightness. The lacing should not be crossed on the side of the belt that runs next to the pulley. Thin but strong laces only should be used.
13. It is desirable to locate the shafting and machinery so that belts shall run off from each other in opposite directions, as this arrangement will relieve the bearings from the friction that would result where the belts all pull one way on the shaft.
14. If possible, the machinery should be so planned that the direction of the belt motion shall be from the top of the driving to the top of the driven pulley.
15. Never overload a belt.
16. A careful attendant will make a belt last many years, which through neglect would not last one.

Water Gas.

This gas is quietly but steadily making advance, being used at the present time in not less than fifty cities and towns in the United States and Canada for illuminating purposes. In some of these, notably in Baltimore, the new process has driven the old coal gas process entirely out of the business; while in New York it is affirmed that at least one-half the illuminating gas used at present is water gas.

In Europe water gas has been lately introduced with marked success as a fuel in metallurgical and other industrial operations; and the importance of this innovation is attracting widespread attention and comment. The friends and advocates of water gas as the

"fuel of the future" may, and doubtless will, have years of bitter opposition still to confront; but with every year the battle they are fighting becomes less fierce and the period of final victory less remote.

We have never doubted what would be the issue of the conflict which has been waged against water gas processes for illuminating purposes by the friends of the coal gas industry. This part of the battle has been fought and practically won, the substantial proofs of the victory being the use of water gas as an illuminant in fifty cities and towns as stated above, and the steady spread of its adoption year by year.

The future water gas, however, as we have often explained, lies in its introduction as a fuel for domestic and industrial uses, and in that direction little has yet been attempted in this country. In Sweden and elsewhere in Europe water gas, manufactured by the "Strong" process, has been introduced as a fuel in a number of large industrial establishments, and with the most flattering prospects of success. The general use of fuel gas for manufacturing as well as for domestic uses implies a thorough revolution in the methods of using fuel the world over. The innovation will continue to find every step of its progress bitterly contested, but ultimate success of its friends and advocates is admitted by all progressive technologists to be simply a question of time. The high heating power of water gas; the cheap rate at which it can be manufactured, by reason of certain improvements; its convenience and cleanliness as compared with solid fuels; the ease and perfection with which its consumption may be controlled for any period, long or short, without waste, are but a few of the many advantages which gaseous fuel offers, and which in due time must force its general adoption in cities and towns, factories and workshops.

THE UTILIZATION OF WORN-OUT HORSES.

The utilization of horses not fit to eat and too old to be of working service in France, is said to be as follows: It is first shorn of its hair, which serves to stuff cushions and saddles; then it is slaughtered and skinned; the hoofs serve to make combs. Next the carcass is placed in a cylinder and cooked by steam at a pressure of three atmospheres; a cock is opened, which allows the steam to be run off; then the remains are cut up, the leg bones are sold to make knife handles, etc., and the coarser bones, the ribs, the head, &c., are converted into animal black and glue. The first are calcined in cylinders, and the vapors when condensed form the chief source of carbonate of ammonia, which constitutes the base of nearly all ammoniacal salts. There is an animal oil yielded which makes a capital insecticide and a vermifuge. To make glue, the bones are dissolved in muriatic acid, which takes away the phosphate of lime; the soft residue, retaining the shape of the bone, is dissolved in boiling water, cast into squares, and dried on nets. The phosphate of lime, acted upon by sulphuric acid and calcined with carbon, produces phosphorus for lucifer matches. The remaining flesh is distilled to obtain the carbonate of ammonia; the resulting mass is pounded up with potash, then mixed with old nails and iron of every description; the whole is calcined and yields magnificent yellow crystals—prussiate of potash, with which tissues are dyed a Prussian blue, and iron transferred into steel; it also forms the basis of cyanide of potassium and prussic acid, the two most terrible poisons known in chemistry.—*Industrial Monthly, N. Y.*

The Brooklyn doctors examined a man to see if he was insane, and as they found six letters from other men's wives concealed in the lining of his coat, where his own wife had never found them, concluded that he was able to transact business.

Smoke Consumption in England.

New York Times: The laudable exertions of the English anti-smokers have at length told on the government: "The Board of Trade has officially declared the exhibition of smoke-consuming apparatus, fuel, etc., to be held at South Kensington from October till November 26th, to be 'calculated to promote British industry and prove beneficial to the industrial classes,' thus conferring protections on all inventions exhibited during the time of exhibition, and for six months afterward (in virtue of the protection of invention act, 1870). The secretary of the admiralty, Mr. Trevelyan, has also forwarded a communication, promising that the admiralty will favorably consider application for trials of apparatus at one or the other of the dockyards, in case the size and character of the appliances shown in particular cases should exceed the capabilities of the testing places already provided." It is remarkable that the smoke nuisance was the first subject which engaged the attention of the Royal Society 200 years ago. Charles II., who loved to dabble in science, and was greatly annoyed by the smoke of Whitehall, strongly backed up John Evelyn in his efforts to prevent the nuisance, and Evelyn produced his "Fugifumum," an essay on the subject, but no successful effort was made; and it was the mixture of smoke and damp, which, a few years later, caused William III. to peremptorily refuse to reside at Whitehall, and angrily replied to a minister who urged him to do so, "Do you wish to kill me?" About twenty years ago an act was passed compelling manufacturers of all kinds in London, even bakers, to consume their smoke, and from the date of that act coming into operation the gardener of the Temple—which abuts on the Thames—has been able to raise fine chrysanthemums. Since then nothing has been done until now. Smoke entails immense expense on London. To take the mere matter of laundry expenses. Assuming the population to be 4,000,000, and that it causes an average additional expense of sixpence a week to each, that is \$26,000,000 a year, and this is but a small proportion of the cost. It involves frequent painting, furniture cleaning, extra servants, etc. Then many buildings, such as the Palace of Westminster, have to be coated with preparations to arrest the corrosive action of the smoke, and, added to all this, the smoke itself is so much fuel lost. Altogether, smoke must cost Great Britain, taking Birmingham, Wolverhampton, Swansea, Manchester, Leeds, Sheffield, etc., into account, not less than \$250,000,000 a year. It must cost Cincinnati and Pittsburg, too, a pretty penny. They should send deputies to London in November to compare notes.

Prof. Horsford on Bread from Coarse Grains.

It is a well-known fact that bread made from rye, oats or barley is heavy, and the reason for this has probably mystified many a miller and house-wife. Prof. Horsford gives a lucid explanation of this phenomena as follows: We have hitherto spoken of gluten as the body upon the tenacity and elasticity of which the capacity of the moistened flour to hold gas bubbles depends. Strictly speaking, this quality is due to a portion only of the body separated from the starch of flour, by washing with water. The body so obtained on treatment with alcohol, is resolved, as already pointed out, into two substances; one soluble and the other insoluble in alcohol. Of the portion soluble in alcohol, there are two, one called mucine—vegetable caseine, and the other called gluten, or gliadin, or vegetable gelatine. It is to this vegetable gelatine that the capacity to hold gas-bubbles is due, and it is because wheat contains a notable portion of it that this grain will yield a highly porous bread, and other cereal grains, oats, rye and barley, for example, which contain only traces

of vegetable gelatine, yield only heavy bread or bread deficient in porosity. It is this vegetable gelatine, the degradation of which by acids produced in fermentation, and so causing a diminution of its tenacity, that deprives the walls of the cells in the sponge of their cohesion and allows it to collapse. It is in consequence of this liquefaction of the vegetable gelatine that flour which has from any cause become sour is no longer capable of making a light or highly cellular bread. To counteract this deterioration, Liebig proposed the use of lime water, which arrests the liquefaction of the vegetable gelatine, and by some kind of combination restores more or less its tenacity. Ritthausen found that solution of sulphate of lime possessed the property of increasing the tenacity of gluten, and so facilitated its separation from the starch of flour by the process of washing. The same end is effected with inferior flours by the employment of small quantities of alum in solution in making the dough, and also in the use of small quantities of sulphate of copper and sulphate of zinc. All these agents have the effect of increasing the whiteness of the bread produced over that which would be produced by the simple process of fermentation. Mege Mouriés conceives that the darkening of the dough, which sometimes occurs even in the use of white flour, is due to an excess of lactic fermentation produced by cerealine, the nitrogenous constituent soluble in water which he finds in the gluten coat. This action, which produces at first proportionately more dextrine, at a later period yields, at the expense of the gluten, ammonia and a brown substance. It is to the predominance of this ferment in the dough of black bread that its extreme dark color is to be ascribed. The presence of acetic and butyric or lactic acid is objectionable because it tends to liquefy the gluten and make the bread heavy and sour to the taste; so also any offensive gases or ethers, such as accompany putrefactive fermentation; so also the degradation of color.

The annual meeting of the Minneapolis Millers' Buying Association was held at the association office, in this city, last week Thursday, and the following officers were elected for the ensuing year: W. F. Cahill, President; E. V. White, vice-President; F. L. Greenleaf, Secretary. Mr. E. B. Andrews, as general Agent and Manager, and the old Board of Directors were re-elected. All present testified to the past year as being a very prosperous one, and looked into the future with most pleasant anticipations. The estimated amount of wheat required to meet the needs of our mills the coming year is 18,000,000 bushels. During the year ending August 31st, the association furnished 10,500,000 bushels of wheat for the millers, and 2,500,000 bushels outside of the association and its control. The river division of the Chicago, Milwaukee & St. Paul, from Minneapolis to Hastings, and the Northern Pacific line have been added to the association control this year.—N. W. Miller

Fairly complete advices as to the barley crop this year indicate that in New York state it will yield 10 per cent more than last season, of about the same quality. In Canada the crop of barley is the largest ever raised in the Dominion, and is fully 25 per cent larger than that of 1880. Some is reported considerably stained, but all is good malting barley. The quantity of bright barley is said to equal that produced last year. There is a very large increase of acreage planted in barley in the northwestern states, although the yield is reported to average not over twenty bushels to the acre, against twenty-three in 1880. The crop there is stained, but is good for malting. There is but little No. 2 Chicago. In Minnesota last year there were 118,500 acres planted in barley. This year there are over 200,000 acres.—Bradstreet's.

UNITED STATES MILLER.

PUBLISHED MONTHLY.

OFFICE, 62 GRAND OPERA HOUSE, MILWAUKEE, WIS.
Subscription Price.....\$1 per year in advance
Foreign Subscription.....\$1.50 per year in advance

ANNOUNCEMENT:

WM. DUNHAM, Editor of "The Miller," 69 Mark Lane, and HENRY F. GILLIG & Co., 449 Strand, London, England, are authorized to receive subscriptions for the UNITED STATES MILLER.

MILWAUKEE, OCTOBER, 1881.

We send out monthly a large number of sample copies of THE UNITED STATES MILLER to millers who are not subscribers. We wish them to consider the receipt of a sample copy as a cordial invitation to them to become regular subscribers. Send us One Dollar in money or stamps, and we will send THE MILLER to you for one year.

The United States Consuls in various parts of the world who receive this paper, will please oblige the publishers and manufacturers advertising therein, by placing it in their offices where it can be seen by those parties seeking such information as it may contain. We shall be highly gratified to receive communications for publication from Consuls or Consular Agents everywhere, and we believe that such letters will be read with interest, and will be highly appreciated.

Our National Calamity.

On the second day of July, 1881, the assassin Guiteau, shot James Abram Garfield, President of the United States, from the effects of which he died after 80 days of suffering, bravely borne, on the 19th day of September. He was finally laid to rest in Cleveland, Ohio, on the 26th day of September.

No event in American history has created such universal heartfelt sorrow and called forth such a number of expressions of sympathy from all parts of the earth, and no words can portray the sorrow of our people for our loss or express their feelings of bitterness towards the cowardly assassin, who merits what he will undoubtedly receive, an ignominious death at the hands of the public executioner.

The career of our late President shows how he, commencing his career a poor boy, climbed the ladder of fame until he reached its top-most round and shows what industry, perseverance and honesty will do in a great and free country like this.

In the sorrow for our great loss there is no talk of politics, parties or creeds, but all alike mourn as for one of their own kith and kin, and our country, from the Atlantic to the Pacific, like the bereaved widow, is draped with mourning weeds. May God grant that the people of these United States may never again be called upon to mourn the assassination of their Chief Magistrate.

ABE L. TEETOR, of Hagerstown, Ind., has just patented a new millstone dressing machine.

We desire every flour mill-owner receiving a copy of this paper to answer the questions asked in our advertisement in regard to Flour Mill Directory, which they will find in this issue. It is certainly worth the trouble to you to answer our request fully and promptly.

THE Minneapolis millers had a grand picnic at Minnetonka lake, Sep. 3d, over 1,200 persons attending. The millers and "their sisters and their cousins and their aunts" were all there. Gen. Washburn furnished the train of 17 cars and the steamboat free of expense to the picnickers.

We are pained to learn that Louis Gathmann, Esq., of the firm of Collins & Gathmann, recently lost his wife. She died very suddenly Sept. 7th. Mr. Gathmann's countless friends will sympathize with him over his bereavement. Mr. Gathmann had a most beautiful and happy home which has now become a house of mourning.

A Word to Advertisers.

The advertising columns of the UNITED STATES MILLER are of great value to all desiring to reach the milling and grain trade. It is sent to all millers in the United States and Canada at intervals (whether subscribers or not), whose names and addresses we have been able to obtain. It is on file in the offices of

the U. S. Consuls in all parts of the world, and also in the principal Chambers of Commerce in America and Europe. Our foreign subscription list is constantly increasing, as also we are glad to note our foreign advertising patronage. We have received many letters of high approval of the UNITED STATES MILLER from subscribers and advertisers. Parties desiring further particulars in regard to amount of circulation, rates, etc., will be promptly supplied with information by addressing us.

DURING the month of August, 1881 there arrived in the United States 65,278 passengers—of whom 56,744 were immigrants, 6,225 citizens of the United States returned from abroad, and 2,309 aliens not intending to remain in the United States. Of this total number of immigrants, there arrived from England and Wales, 9,018; Ireland, 5,391; Scotland, 1,599; Austria, 1,643; Belgium, 169; Denmark, 800; France, 562; Germany, 19,431; Hungary, 413; Italy, 641; Netherlands, 816; Norway, 2,817; Poland, 206; Russia, 694; Sweden, 3,889; Switzerland, 871; Dominion of Canada, 5,746; China, 1,785; and from all other countries, 253.

UNFORTUNATE MICHIGAN.—During the past month the State of Michigan has suffered greatly from forest fires. It is estimated that 750,000 acres of land were burned over and 300 lives were destroyed. The damage to property is estimated to be over a million dollars. Huron and Sanilac counties are the heaviest losers. The residents from these counties are principally immigrants from Canada and Europe and were generally engaged in farming in a small but prosperous way. Bereft of their crops with winter so close upon them they are indeed in a pitiable condition, and it will well become all those who have been fortunate through the season and have money, provisions or clothing to spare to contribute liberally to their relief. The Chambers of Commerce in all parts of the country have already raised a considerable amount, and business men in general contribute freely. Millers and farmers, who have enjoyed a fair season, should remember the unfortunate in their time of need.

Prof. Van den Wyngaert Among the British Millers.

Prof. Van den Wyngaert, president of the German Millers Association recently visited the Millers Exhibition in London and in a letter to *Die Muehle* said: "There were 42 speeches made at the banquet during the London Exhibition all referring more or less to the United States. Assertions were made that English millers would soon make it difficult for the Americans to compete with them in their home market. They would show Americans that they understood milling just as well as they did and perhaps better. This was rather 'showy talk' and I could not resist saying in my answer to the toast to foreign millers that they all feared the American millers just as much as we on the Continent and if it was not so that I felt quite sure that every speaker would not have troubled himself to refer to them. England intends to remodel her mills. I think it to be absolutely necessary, for very few mills in the United Kingdom are operated on a real good system. This is probably the principal objection British millers had to showing their mills to visiting millers. They all answered the politest request of visiting millers by their common phrase 'it is not our chub to show the mills to everybody.' Our German and Hungarian millers showed a vast deal more hospitality to the Englishmen when they visited our mills some three or four years ago.

THE Melbourne (Australian) *Leader*, of July 30, has come to hand, and announces that the Adelaide Exhibition has been successfully opened, in the presence of about 12,000 people. The total attendance the first day reached 17,254. At very short notice exhibits were sent from eight European countries, from America, Japan, and the British colonies. Of course everything is on a small scale, the total space occupied by the building being only 90,000 square feet. Considering the shortness of the time, however, it is considered a very creditable result. Unsold exhibits from Melbourne have even been supplemented in some instances by fresh shipments from Great Britain, from which it is plain English manufacturers have found the advantage of a display of this kind. One particular in which the enterprise differs from that at Melbourne is that it is not directly created by the State, but is the product of private enterprise.

The Hungarian Milling Industry.

[Translated from the *Deutsche Mueller Zeitung* for the United States Miller.]

The manufacturing of flour, the favorite industry of Hungary, has of late years been on the decline. We have noticed the frequency of complaints in Hungarian milling papers of late, and statements of the various causes for such decline. It must be admitted that Hungarian mills have lost ground in many instances and therefore have been compelled to reduce their production, on account of which they have been unable to pay the enormous dividends of former years, which have been as high as 35 and 40 per cent on invested capital. It is our opinion, however, that these mills, being located in an extremely favorable wheat producing section of the Continent, will maintain their fame even if their dividends are reduced. The *Pesther Lloyd* in a recent issue says: "For the past two years our mills have worked with scarcely any profit, and we are now on the threshold of a new campaign which possibly may not effect an improvement on the unfavorable results of the past two years.

So far as we are able to judge at the present time, our present harvest is no improvement on those of the past two years, and as a matter of course the price of wheat has advanced to a high point rapidly, and we cannot yet know whether or not we shall be able to find a good market for our flour abroad, on account of the present high and future possibly higher prices asked for wheat in those foreign countries which have heretofore been our steady customers. We earnestly hope that our flouring industry may improve. It seems queer that our mills should, as they have of late, be the only ones to run at the sacrifice of even the smallest grinding profits—yes, even with a constant loss. Since 1879 our mills have had the alternative of losing money by running, or standing idle, and in the most favorable case to do business without a profit.

Our mills are obliged to publish an annual statement of accounts. Let us glance at them. The abnormal condition of the difference between the prices of wheat and flour began to be felt after the first eight months of 1880. We find that the total amount ground was 10,700,000 bushels in 1880, against 13,000,000 bushels in 1879, and it must also be borne in mind that the capacity of our mills was greatly increased in 1879-80. We also find that the nine stock company mills in Pesth, earned in the year 1880, \$257,000, which is equivalent to about 2½ cents for each bushel ground. This showed a profit of five per cent on the investment, which the companies were cautious enough to set rather low, at the close of the year.

Returns from 31 provincial mills show that they have ground 5,000,000 bushels and made a net profit of \$150,000, (3 cents per bushel). This is a small margin when we consider the favorable geographical situation and the profitable local trade of some of these mills.

We believe that many of our millers would be glad to boast of as favorable a result for the first seven months of this year as of last. It is our opinion that during the next season our millers will have to relinquish all toll for grinding, and will not be able to pay even the smallest dividend on capital invested. This is the present condition of the Hungarian milling industry—one which in technical matters, was the mother of the most rational system of flour manufacture in the world, and which now must witness with quiet resignation how her discoveries, inventions, experiments and accomplishments of the past decade are appropriated by more favorably situated rivals, who are enriching themselves therewith, while this best developed industry of our country is steadily declining on account of an unnatural difference in the price of wheat and flour. Our millers have paid a high price for wheat, believing that they could afford it on account of their economical system of manufacture, and consequently the price of wheat has become high and remains so. Flour is imported, notwithstanding a protective tariff, and an export trade to Germany is hampered by the same means, and the mills are constantly increasing the stock on hand and therefore its price is low."

DEATH OF D. C. HOWES.—D. C. Howes, of the firm of Howes, Babcock & Ewell, died at his residence near Wyoming, N. Y., Sept. 15th, 1881. His death was sudden and unexpected. He was in his usual health as far as anyone knew up to within a few minutes of his death. He was born in the same town in which he died, in September 1821, and was therefore, sixty years of age. Mr. Howes was well known to the milling fraternity everywhere

having been engaged for 20 years in selling milling machinery, 15 years of which were for the firm of which he was a member. His genial manners and kind heart won him hosts of friends throughout the country who will sympathize deeply with the widow who mourns his loss.

GRAIN STORAGE IN AND AROUND NEW YORK.—The great grain elevators and warehouses of this port provide storage for 22,800,000 bushels. Their capacities are given as follows: New York Central, 2,300,000 bushels; New York, Lake Erie, and Western Railroad, Jersey City, 1,500,000 bushels; Pennsylvania Railroad Jersey City, 1,500,000 bushels; Dow's Elevators, Brooklyn, 2,500,000 bushels; Hazeltine & Annan's Elevators, Brooklyn, 2,500,000 bushels; Grain Warehousing Association, Brooklyn, 6,000,000 bushels; Robinson's Stores, Erie Basin, 2,800,000 bushels; Pinto's Stores, Brooklyn, 1,000,000 bushels; Woodruff & McLean's Stores, Brooklyn, 1,500,000 bushels; other elevators in New York and Brooklyn 2,200,000 bushels.

The stock in hand August 27th was: Wheat, 3,882,051; corn, 3,070,716; oats, 2,817,638; barley, 7,041; rye, 9,692; peas, 9,713; malt, 82,273—total, 9,879,124.—*Scientific American*.

A PROPOSAL has been suggested to utilize the vast water supply of the extreme north of America by closing the northerly outlet of the valley of the Mackenzie river at the line of 68 degrees, and thus storing up the water of one million two hundred and sixty thousand square miles, to which could be added the water of other large areas. This announcement is made in a number of our English exchanges. The ingenious explanation of the engineering project is given as follows: A lake would be formed of about two thousand miles in length, by two hundred of average width, which would cover, with one continuous surface, the labyrinth of streams and valleys which now occupy the Mackenzie valley. It would be a never failing feeder for the Mississippi, and would connect with Hudson bay and the great lakes, and also with the interior of Alaska through the Yukon and its affluents. The connection of the Upper Mississippi with Lake Mackenzie would be a comparatively easy matter, and a vast amount of navigable waterway would be added to this river. The formation of Lake Mackenzie would also contribute to the proposed ship canal from Cairo to the Gulf of St. Lawrence by the almost straight line which cuts the Wabash valley, the lakes Erie and Ontario, and lower St. Lawrence. This renders matter simple and easy, as may be seen at a glance.

THERE are in Europe 40,000 breweries, which produce annually 2,250,000,000 gallons of malt liquors. Great Britain alone produces over one-third of the entire quantity—or to be exact 785,017,000 gallons, Prussia stands second, producing 318,579,998 gallons; Bavaria comes next, with 260,757,000 gallons. Austria produces 245,975,158 gallons, and France, 155,980,000. The proportion in which beer is consumed in the different countries is about as follows: Bavaria heads the list with 54 gallons per head per annum, over a gallon a week for every man, woman, and child in the country. Belgium comes next with 30 gallons, and England is about the same, 29 gallons, or rather over one half gallon per week per head. In Germany, including Bavaria, the average consumption is 19 gallons per head; Scotland 9, and Ireland only 8½ gallons. Austria consumes only 6 gallons per head, and France but four.

DOUBLE-GLAZED WINDOWS.—A writer in the *English Mechanic* points out some of the advantages of double-glazing in promoting the health of homes in winter. Sky-lights, he says, ought never to be put up unless double or double-glazed. Double-glazing answers perfectly if the sashes are grooved out for glass on each side, and are then glazed with an air space of one-half inch or more between the panes of glass. The glass must be put in with its inner faces perfectly bright and clean, and the glazing should be done on a cold dry day, so as not to include watery vapor, which in cold weather will condense inside the air space, and cause a mistiness. This double-glazing with an air space makes a window almost as warm as a brick wall, and not only keeps up the temperature of a room in winter, and saves fuel, but it keeps the room cool in hot weather, and makes the temperature more uniform throughout the apartment. With ordinary thin glazing in winter the inmates are always being chilled on that side which looks toward the window, and baked on the side that is toward the fire. Double-glazing our window sashes would save all this trouble.

The Most Comprehensive Description of the Methods of Manufacturing Flour.

[The N. C. Miller Prize Essay, by E. C. Johnson, of Michigan City, Ind., read before the Fire Underwriter's Association of the Northwest, at their Twelfth Annual meeting in Chicago, September 14th, 1881.]

Omitting what is now generally understood concerning the methods and hazards of flour milling to-day, and producing such facts as every underwriter wants to know, but cannot readily find, would seem to be the most profitable use of the time allowable here. Still such a treatise, if ascertainable, would not be comprehensive, nor would it be clear enough to avoid confusion and oversight of facts which, though familiar, should not be ignored and forgotten. Much, that might be interesting, must be omitted here for brevity; and the description of these methods, and their fire hazards, will necessarily be more suggestive than explicit.

I. Wheat milling has been passing through an epoch of research, trial, and progress; each new development leading to the necessity of others, until no enterprise was ever so completely unsettled and besieged with changes, experiments, and inventions, as this. A few new methods have been produced, and have succeeded in gaining some position; but the leading systems are simply a revival and elaboration of old methods, supplemented by new adjuncts. During the past ten years many important points have, by persistent experiments, been determined. However, there are only a few mills using exclusively any one specific system of reduction, except such unimportant ones as still adhere to the old flat mill-stone process. Numerically speaking, only a few mills employ these different systems of granulation in the same relative manner. The most extensive new, and remodeled, mills are making substantially a systematic and similar use of the various devices for reduction, resulting from personal and compared experience. The fact that modern milling requires modern management has greatly retarded this revolution in milling methods; and the desire to produce competing grades of flour has led to so much experimenting generally as to create a great confusion as to methods and their application. This condition of general research and investigation has so unsettled the milling system as to render it difficult to ascertain, certainly, their relative merits. Those best qualified to tell were not disposed to give much public information. The milling press, while it has frankly and ably discussed all methods, naturally inclined to impartiality, has cheerfully given space to the advocates of each, but, as yet, found little to criticize in any. Persons, seeking the ultimate facts, can find volumes in support of each specific device; but, if depending largely on reading alone, are likely to emerge from it beautifully bewildered.

Envroned with all these conditions for nearly ten years, American milling to-day, in its cardinal features, is eclectic;—a combining of the useful discoveries of all the various ways, to suit convenience and circumstances. Nearly every wheat district has its old low grinding, its new process, and its half high process, mills, with a rapid tendency to a more gradual reduction, or high grinding process.

II. It is now generally admitted that certain roller mills are very valuable auxiliaries to all other systems. There are few progressive mills which have not adopted rolls in conjunction with mill-stones, for certain purposes. There is a quite common belief that their greatest efficiency is realized in connection with mill-stones and other systems.

All practical millers admit that the system, which most thoroughly removes all extraneous and constituent discoloring elements from the grain, and produces the purest grades of flour, with the least waste of material, is best, and that less efficient devices and systems cannot long, or successfully, compete against such.

III. The combined existence, representing the expenditure of millions of money, though acting individually, has conclusively determined three important points in wheat milling. 1, that this separation of the constituent parts of the grain is a delicate matter, and must be thoroughly done. 2, That it can only be successfully accomplished by a gradual process. 3, that it must be effected by even granulation, and with the least possible heating of the material, or chop, produced.

There are ardent, interested advocates of various burr, roller, roller and concave, disc, and combined systems for reduction, each claiming to most successfully accomplish the common object, as stated above, and all are, as yet, doing a thriving business.

A man of conceded superior practical knowledge of milling, having for over thirty years been actively and studiously identified with

progressive men, not only making personal experiments, but latterly, with a prominent milling interest,—entrusted with all tests and trials arising in the transition from the low grinding to the present gradual reduction process;—in short, a man whose name alone would have more force with representative millers than any possible eulogy, declares, that the roller system more perfectly accomplishes the stated objects, than any other system, or combination of systems, in use; that the flour, though not apparently whiter, will produce better results. This information, coming from a man independent of all systems, and thoroughly disinterested in any, shows that roller mills have come to stay. This competent expert, if governed by less than logical conclusions, warranted by exhaustive tests, would naturally defend the old familiar mill-stone system, but it is his conscientious and conclusive belief, that mill-stones can never be made to produce even granulation, or let go of the chop just where this is done.

However, the present sized rolls, 9 x 18 inches, have such limited capacity, as to make them expensive, because they are so slow, and it requires a large number of them to do the work. In Europe, where rolls have been used longer and more exclusively than here, rolls of two feet are now being introduced. Whenever a new system is produced which will effect a saving, in any way, of fifty cents per bbl., the expense of discarding the old, and of adopting the new will not, and can not be allowed to prevent the change. During the past six years, many newly equipped mills have been refitted from top to bottom, at an expense almost equal to first cost throughout; others have discarded a large number of newly set, and costly devices, as so much scrap iron, when found less efficient than others in use.

Some theoretical millers hold that the mill-stone system has not yet reached its possible perfection. That the oscillations of the runner, suspended on a cock head, caused by imperfect tram, side-pull, and back-lash, and by vibrations from the running weight of the spindle and burr resting on one end of the bray beam constantly shifting the relative faces, account for the present imperfect granulation by this system. They look for some perfected form of spindle, tram-pot, and lighter screws, which will secure a solid foundation for the spindle and runner, to obviate this damaging trituration of the wheat, by the mill-stone system.

The experienced authority, referred to above, says that the present mill-stone plant, on solid hurst frames, is the best adaptation possible; that the present running balance is as perfect and even, when properly adjusted, as anybody could wish; that the oscillations of the runner are not perceptible; that it is not the oscillations, but the grinding surfaces reducing part of the constituents to dust before it is dropped by the skirt, instead of letting it go at whatever point it may have reached a proper fineness; that the attention of the best brains in the world have been given to the mill-stone system, for over two hundred years; that the cause of uneven granulation, by this system, is insurmountable; that it is only a question of time, when the mill-stone will be discarded entirely. This is the unbiased verdict of the best authority in the land, practical, because determined wholly from years of experience, research, and practice, by a man, who has made a marked financial success of milling. It seems apparent that, ere long, persons, desiring to carry out the scriptural injunction, can be provided with the requisite article without expense, and with suitable dress included. However, in any event, mill underwriters are likely to be confronted with the present medley of systems, for some time to come, but in such a settled condition, as will work no particular disadvantage, insurance-wise, provided proper discriminations are made to cover experimental and speculative hazards.

IV. There are four processes of reduction, in which the various systems are used.

1. The low, or flat reduction process, employing the old mill-stone system alone; but may be effected by the various under-runners, and other forms of burr mills.

2. The new process, employing either of the mill-stone systems alone, with modified dress.

3. The half-high reduction process, accomplished by either the mill-stone systems alone, or by mill-stones and rollers combined, and by roller and concave mills.

4. An elaboration of the latter method, styled the high or gradual reduction process, accomplished by either of the millstone systems alone, or by either of the roller systems alone, but now, more generally, by a combination of millstones and rollers, and by devices

especially adapted, styled gradual reduction machines and disks.

The supplementary machinery, employed in these various processes for cleaning, scouring and heating, and, after reduction, for bolting, scalping, separating, purifying and sizing, does not necessarily differ, except in the important sense of volume. This will appear more clear by analysis of these various processes.

1. The aim of the flat reduction process was to obtain the largest yield of flour possible from a single reduction, and subsequent bolting. This process is little used now, except in small custom mills in winter wheat sections. Low or flat grinding of spring wheat produces such a dark, poor quality of flour, as to render it no longer available, even in custom mills, where spring wheat predominates.

2. The new process aimed, by granulating the wheat, to obtain the greatest possible quantity of middlings, from which to produce a higher grade of flour. It consists of two reductions; the one, a granulation of the wheat, followed by bolting and purifying of the middlings; and the other, a reduction of the purified middlings obtained, followed by the usual bolting.

The process of middlings milling at once proved its superior efficiency, in utilizing the intrinsic properties of spring wheat, and producing a strong, white flour, equal in quality to any made in this country. Thus, the great cereal product of the Northwest, which threatened to be, and had almost become, a drug in the grain markets, found a new and lively demand, and was gradually given its place among the best grades, and highest quotations. Persistent experiments were made to obviate the necessary waste of material in this process, and yet retain its advantages over that of flat reduction; these efforts led to half high grinding.

3. The half high reduction process aims to obtain the largest possible yield of clean middlings, from which to produce higher grades of flour, and more of it, by a closer separation of the products. It consists of at least three reductions, each followed by bolting, separating, and purifying, &c.

The high, or gradual process, consisting generally of five, but sometimes more, reductions, quite closely resembles "the Hungarian method," and is so styled by some, but improperly, since the Hungarian process in detail has not yet been introduced in this country, and is not likely to be, as it is entirely to gradual for Yankee notions.

The true Hungarian process makes from fifteen to twenty reductions of the grain and its products by means of roller systems alone, and by millstones and rollers combined, each followed by bolting and purifying; and produces from eight to eleven grades of flour, for some of which American millers would find no open market.

4. The aim of this gradual reduction process is identical with the styled half high, but the first reduction is simply a splitting of the kernel, to degerminate and to remove the grayish dust from the crease of the wheat, and other discoloring elements, which in other processes, are incorporated with the product, and cannot be removed by bolting. This first reduction is properly a continuation of the cleaning process, followed by at least four reductions and subsequent bolting, purifying and sizing of the middlings obtained.

It is now generally admitted, that the new and half high reduction processes do not make so close a yield as that of low grinding, but that the superior quality of flour, especially from spring wheat, would compensate for the loss of material, were it not for the competition with the more efficient high milling. It is claimed that the high or gradual reduction process on any wheat not only produces a closer yield than either, but also superior qualities of flour. The claim seems entirely reasonable, with the devices now used to utilize the flour dust, obviating the waste through the dust house, and through improperly finished bran, grits and tailings.

The adoption of this gradual reduction process by the leading new and remodeled merchants mills of this country, after years of personal and experimental trial of all, leaves little room to doubt that it will soon become the one process in general use.

Although there are four specific processes of reduction, and at least five distinct systems by which they may be accomplished, it must be distinctly remembered that each of these processes, at least the last two mentioned, can be and are being accomplished by a widely different application of the systems and devices for reduction. The distinct systems of burr mills, roller mills and granulators cannot

only be successfully used singly in a specific process, but also in such variations as to render the combinations nearly, in this connection, practically endless. And yet all mills, using the same process, are substantially identical in purpose and results. It is safe to say that no two mills are using a specific system, or combination of systems identical in detail. Therefore the only practical treatment of the methods, and their five hazards "in detail," must have reference to the specific devices in general use. For brevity, these will be treated in connection with their fire hazard.

Are British Millers Discouraged?

For some time past the British papers have been giving to their readers items of information in regard to the progressive and aggressive spirit of the American millers. Notwithstanding the dubious condition of the English milling industry, the press strives to encourage the trade. The *Corn Trade Journal* in a recent number says:

"There can be no doubt, if there ever was any, that the Americans must be fought with their own weapons. The English millers must make equally good flour, and as great a proportionate percentage of it, as the American miller, and to do this he must have the best appliances, which, in reality, is the cheapest method of manufacture. In the season just commencing we apprehend that there is a prospect, in spite of what the American journals may say, of a temporary decrease in the force of the American competition. The American wheat crop this year is some 100,000,000 bushels less than last year; this gigantic decrease of production cannot fail to have some effect on the quantity of flour exported, which in the past year has been in the proportion of about 19 per cent; European millers will, therefore, probably, have a little more room for action in the present season, and we hope that they will avail themselves of the opportunity. We do not wish to be understood to be despising American competition; competition is beneficial to the nation, whatever form it may assume, and there is room for American flour in the European markets, and plenty of it too; but what we do wish to advocate is that the English consumer may be supplied in a fair and just proportion, by home ground flour. We admire the energy and example that might well be copied; but many things must happen before flour takes the place of wheat in our imports."

The British millers have waited too long before commencing to make improvements and America has taken advantage of the fact. It matters little except for the present year about our decreased wheat production for 1881. Good prices will stimulate a greater acreage another year and perhaps an immense crop. With our wealth of rich wheat land, with our system of farming and of flour manufacture we can make headway against any opposition that Europe can command. The *British Mercantile Journal* published a lengthy article recently from which we take the following:

"It is the surprising growth of the milling industry in the United States which fills our home trade with the most serious misgivings; for, whereas the quantity of flour coming from the States was only 1,772,000 cwt. in 1877, it was nearly 3,635,000 cwt. in 1878, rose to 6,866,000 cwt. in 1879, and reached nearly 7,000,000 cwt. last year.

"There is also every indication of the permanency of the rapid increase. One authority has it that in the State of Minnesota alone the mills turned out 6,000,000 barrels in 1879, and that the mills of Illinois, Wisconsin, Iowa and other states produced no less than 15,000,000 barrels in the same year. The city of Minneapolis has twenty-two mills, with a capacity of 15,000 barrels daily. At St. Louis nearly 2,000,000 barrels of flour were manufactured last year; and in both these great centres of the milling industry a number of new mills are in course of erection. The substitution of flour for whole grain in exporting lessens the weight for land transportation and shipment by about 30 per cent, as the proportion of fine baking flour yielded by the wheat is some 70 per cent; the remaining portion of inferior flour, offal and bran being used as a valuable interchange with maize for fattening American cattle. Even the packing in bags in place of barrels has had its effect. It has contributed toward economizing of room in holds of vessels, and the matter of cost reduced to a minimum by the smaller outlay necessary for the bags, and the realizing of their values when discharged in this country. Indubitably, therefore, the situation is, 'not to put too fine a point upon it,' serious, and millers are apprehensive that their anticipations—that at a not very remote period the vast imports from the other side of the Atlantic may, for the greater part, if not indeed wholly, take the form of flour instead of grain—may assume an unpleasantly material aspect. Without wishing to be 'alarmist' like, or to prognosticate that our national milling industry will become obsolete, it serves no good purpose to mince matters, and the British miller had better look to his guns if he wishes to hold his own in the whirlwind of competition.

E. V. White & Co., of Minneapolis, are increasing the capacity of the "Standard Mill" by putting in 5 more of Gray's patent noiseless roller mills.

UNITED STATES MILLER.

E. HARRISON CAWKER, EDITOR.

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MILWAUKEE, OCTOBER, 1881.

ALBERT HOPPIN, editor of the *Northwestern Miller*, read an essay on "American Milling Methods," before the Pennsylvania Millers' Association, in Pittsburgh.

THE mill furnishers throughout the country are all busy and prosperous. Many have orders ahead that it will take them months to fill, and still the orders come pouring in.

THE Nunnemacher Company was duly incorporated, last month, under the laws of the State of Wisconsin. It is now styled "The Nunnemacher Company, Limited." Capital \$100,000. H. Nunnemacher is President, and Albert Zinn Secretary and Treasurer.

THE Pennsylvania Millers' Association met at Pittsburgh, Pa., Sept. 13th. A very fine exhibition of milling machinery was made at the Industrial Exhibition there at that time, and a number of medals and premiums awarded, four of which were awarded to Milwaukee manufacturers.

THE Milwaukee Industrial Exposition is in full progress, and thousands of visitors from all parts of the Northwest have come to Milwaukee to visit it. It is a grand exhibition and well repays visitors for the time and money it costs to see it. There is but little milling machinery on exhibition, but what is there, is good.

ANOTHER MINNEAPOLIS MILL.—In regard to a milling enterprise in Minneapolis the *Northwestern Miller* says: "Its location, instead of being on the site of the Bassett saw mill, will be just above it, where a head of about thirty-two feet is obtained. The mill building is to be 50x150 feet, seven stories, and is gauged for a thousand barrel capacity. The first two stories of the building will be stone and the remaining five of brick. The work of excavating for the foundations has already been commenced, and if the weather is favorable, the firm hope to have their new mill making flour by the middle of next March. The millwright work will be done by Gunn, Cross & Co. The firm name will be Zeidler, Zimmerman & Co., Mr. Zeidler acting as manager, Mr. Zimmerman as head miller, and Mr. Bassett doing the heavy work."

N. F. Burnham, York, Pa. In the past few weeks has filled thirty-two orders for his well-known Standard Turbin Water Wheel, and shipped them to the following gentlemen:

Albert Mado, Guanajuato, Mexico, 1 12-inch outer cased wheel; Madison Woolen Co., Madison, Me., 1 66-inch wheel; Geo. W. Dillard, Scottsville, Va., 1 163-inch wheel; P. H. Loud, Williston, S. C., (office No. 135 Meeting street, Charleston, S. C.), 1 18-inch wheel; John Bruner, Cuthbert, Ga., 1 104-inch wheel; A. C. McKinney, Lock Haven, Pa., 2 12-inch wheels in wrought iron case; J. J. Junigin, Cuthbert, Ga., 1 12-inch wheel; G. V. Jourden, Camden, S. C., 1 27-inch wheel; Pendleton & Bro., Augusta, Ga., 1 30-inch wheel; T. H. Newkirk, Magnolia, N. C., 1 54-inch wheel; J. E. Person, Fremont, N. C., 1 15-inch wheel; Wm. Y. Johnson, Meadville, Va., 1 36-inch wheel; M. T. Holley, Aiken, S. C., 1 104-inch wheel; Romer Brothers, Gawando, N. Y., 1 27-inch wheel; H. W. Jewett, Gardner, Me., 1 42-inch wheel; Hubbard & Blake Manufacturing Co., West Waterville, Me., 2 54-inch wheels; G. A. Savery, Talladega, Ala., 1 24-inch wheel; Rookstool & Carlisle, Alderson, West Pa., 1 74-inch wheel; John Swanson, Oil Creek, Va., 3 24-inch wheels; Geo. Hardy, Belfast, Me., 1 48-inch wheel; B. F. Spence, Elizabeth City, Va., 1 30-inch wheel; A. Coulter, Parkman, Ohio, 1 9-inch wheel; Sellow & Co., Gawanda, N. Y., 1 36-inch wheel; Townsend Revin, Bolivar, Pa., 1 134-inch wheel; Bodwell, Granit Co., Jonesboro, Me., 1 48-inch wheel; Ogburn & Bro., North View, Va., 1 30-inch wheel; D. Macelwrath & Son, Cork, Ireland, 1 24-inch wheel; M. P. Hall, Charlottesville, Va., 1 164-inch wheel.

THE *Oesterreichische Ungarische Mueller*, for September, in an article entitled "Gloomy Prospects for British Millers" says: "It is beyond any doubt that the production of flour in England, by whatever system it may be ac-

complished, always will be more difficult than anywhere else. The United Kingdom is bound to import half of the amount it consumes, and the English millers therefore are compelled to use all of the various sorts imported. They cannot, like their American and Hungarian colleagues, grind respectively only American and Hungarian wheat, but will to-day receive at their mills the hard wheat of South Russia, to-morrow the softer wheat of America, and the day after, the soft wheats of Egypt and South Africa or Australia. English millers consequently are compelled to be continually watchful and gather all possible information about those different sorts of wheat in order to be able to secure the most favorable results.

There are about 10,000 millers in England, mostly intelligent men dreading the future of their trade. The English farmer cannot grow corn (maize) successfully, and wheat cannot be raised as cheaply as in America or even Russia.

The misfortune of insufficient home production is supplemented by another formidable one—the heavy importation and offering of flour at low prices from well constructed American and Hungarian mills, which almost render the British mills superfluous. American flour exports to Great Britain have steadily and rapidly increased. Americans lately send their flour in sacks, instead of barrels, and consequently ships can load more of it and it can be sold still cheaper than before.

If the American, Russian, Wallachian and Hungarian millers and flour exporters were fully cognizant of the grades of flour most in demand in Great Britain, it is beyond doubt that by far the greatest quantity of breadstuffs consumed in their market would be imported in the shape of flour instead of grain, and thus many English millers would be forced to idleness and suspension of business.

An Expert's Opinion about Roller Mills.

Mr. J. C. Heuler, headmiller of Jones & Co. at New York City, wrote to a friend at Cedarburg, Wis., and his letter was handed to us. We have taken the liberty of reproducing this letter partially, without any criticism thereon or assuming any responsibility.

* * * In regard to the roller mills I have to say that I have already worked with a good many of them. The Walz-Muehle of Budapest is, as you know, the oldest roller mill and considered the trial-mill of Hungary. Every new roller invention was tried in that mill first, and the judgment of the managers was sought for by the inventors and other mill-owners. During my engagement at the Walz-Muehle as head miller, I have worked with 64 six roller mills, system Salzberger; 36 six roller mills, system Nemelka; 9 three roller mills, system Ganz—(ring rolls); 2 two roller mills, system Nagel & Kaemp. Also I had the following four roller mills to work with: Ganz's corrugated iron rolls, Ganz's smooth iron rolls, Wegmann's porcelain rolls, Lang & Company's smooth and corrugated rolls, Woerner and Company's smooth and corrugated rolls. Besides those I had some Hagenmacher two roller mills and Zipser's wheat cutting machines.

In this country I have worked Downton's smooth rolls at Minneapolis, also with the Allis-Gray roller mills. Now, of all those roller mills I am emphatically in favor of the Allis-Gray roller mills, and would advise you to buy and use those in your mill.

The Ganz ring rolls are very well for grinding fine dust middlings, and the Nagel & Kaemp's rolls are well fit for low grade stuff, but the Allis-Gray rolls are equally well fitted for all the various classes of work that are to be done in a mill of the high grinding character. The mills run noiselessly and master more stuff for their size than any other mill I ever worked with. My assertions are impelled by my candid opinion, and I am ready at any time to prove even to other roller mill inventors that I am right. * * *

Rye Flour Milling With Rollers.

In a recent article on the above subject by head-miller A. Langeseck, published in the *Ungar. Muehlen Zeitung*, he said that he tried to grind the rye on rolls but found he could not do it satisfactorily. The first two reductions grinding rather close, resulted exceedingly well, but the last reductions could not be made radical enough to deliver clean bran except at a sacrifice of the sharpness of the corrugations. He states that he bolted out of the first break 18 to 20 per cent of No. 1 flour and 15 per cent of dust middlings, which after being ground on a French burr, yielded 8 to 10 per cent more of No. 1 flour. The second break bolted out 20 per cent of No. 2

flour and 10 per cent of dust middlings, which were ground with 10 per cent of the No. 1 dust middlings, on another French burr and resulted in 12 to 13 per cent of No. 2 flour. In grinding the bran on stone he got off 12 to 14 per cent of No. 3 flour, and the grinding up of the low grade middlings on stone yielded 4 to 5 per cent of No. 4 flour. The color of the No. 1 and No. 2 rye flour was of a surprising whiteness, in comparison to rye flour ground on stones and was of an unsurpassed purity.

Some of our millers having changed over their mills to the roller system, may find the above worth a trial in grinding their rye (if they have a market for rye flour) on corrugated rolls, making two reductions therewith and finishing up the middlings on stones.

New Publications.

AMERIKANISCHE REISEBILDER. (American Sketches while Journeying)—By K. Ludloff. Second edition.

This is a carefully written pamphlet of 125 pages and will prove of much value to all Germans in Germany who contemplate emigrating to the United States and especially if they desire to obtain homes in Wisconsin. The book can be had by addressing Brucker & Ludloff, No. 144 Clinton st., Milwaukee, Wisconsin.

GRIMSHAW ON SAWS.—History, Development and Action, Classification and Comparison, Manufacture, Care and Use of Saws of all kinds. 160 pp., 8vo. Cloth. 234 Illustrations. By Robert Grimshaw. E. Claxton & Co., publishers, Philadelphia.

This thorough work, impartially written in a clear, simple, and practical style, and supplemented by valuable tables, treats the saw scientifically, analyzing its action and work, and describing under the leading classes of reciprocating and continuous acting saws, the various kinds of large and small hand, sash, mulay, jig, drag, circular, cylinder and band saws, as now and formerly used for cross-cutting, ripping, scroll-cutting, and all other sawing operations in wood, stone and metal, ice, ivory, etc., in this country and abroad. With appendices concerning the details of manufacture, setting, swaging, gumming, filing, etc.; tables of gauges, and other valuable information. Elegantly printed on slate paper. Cloth bound, gilt side and back stamps. Price \$2.50 by mail.

THE TREATMENT OF STEEL. Published by Miller, Metcalf & Parkin, of the Crescent Steel Works, Pittsburgh, Pa.

This is a small work but exceedingly comprehensive. It tells all about steel and its manufacture in as few plain words as possible. Its pages show the work of a practical, business mind.

ZELL'S UNITED STATES BUSINESS DIRECTORY FOR 1881. Published by the U. S. Directory Co., No. 114 Arch street, Philadelphia, Pa. Price ten dollars.

To the business community of this country the above named work of over 1,200 finely printed pages will prove of great value. It contains classified lists of banks, manufacturers, merchants, wholesale traders, jobbers, commission merchants and retail dealers, also, a list of importers, manufacturers, bankers, etc., of the principal cities of South America, Great Britain, France, Italy, etc. We commend the work to the business world.

Tungstate of Soda for Fire-Proofing.

Tungstate of soda is a compound of a metallic acid with a base.

In 1881 a Swede named Sheele, while experimenting with a mineral of unknown composition, discovered tungstic acid; and from this the discovery of the metal tungsten was but a step. The ore from which these discoveries were made is now known as Sheelite or wolframite. The chemical composition of wolframite, according to Dana, is:

Tungstic tri-oxide.....	76.47
Iron protoxide.....	9.49
Manganese protoxide.....	14.04
	100.00

It is found in the United States in Maine, Connecticut and Nevada, and in small quantities in a few other States. In Cornwall, England, it is associated with tin, and in other portions of Europe it is also found.

The compounds of tungsten have received comparatively little attention. Sheele, Bergelius and a few others being the chemists who have given them any study whatever. They are now taking a more prominent position, as new uses are constantly being discovered for them.

There are two principal methods of producing tungstate of soda. The first is by dissolving caustic soda in tungstic acid. The second and more common method is by fusing wolframite with carbonate of soda, and exhausting with water. The salt is white and opaque, having a bitter saline taste and giving an alkaline reaction. The principal uses of

this salt are for calico printing, fire-proofing and painting, and in the manufacture of tungsten iron and in photography. Its use was attempted in calico printing as a substitute for stannate of soda as a mordant. For this purpose it was not up to the requirements, and had to be abandoned.

The colors produced by some of the compounds of tungstate of soda are very beautiful, but as yet no methods have been devised for fixing them. Tungstic acid produces a yellow with some fabrics, while oxide of tungsten gives a blue. There is a peculiar blue precipitate obtained by adding to tungstate of soda and zinc slips, an excess of hydrochloric acid. The resulting precipitate, which is a fine blue powder, being collected on a filter and dried will in a few hours lose its blue color and become perfectly white.

Steel treated with tungstate of soda is said to acquire greater hardness, higher susceptibility to temper and increased tenacity.

In fire-proofing there are few if any chemicals that can replace it. It is true that non-combustible material can be manufactured from asbestos, but to render combustible material fire-proof is another and more important matter.

By treating fabrics with a strong solution of the salt they become practically fire-proof. All the gauzes in use in theaters, such as gauze scenes, dresses, etc., should be treated with this chemical.

Combinations of tungsten make very good non-combustible paints. Tungstate of lead (Scheelite white) is a very brilliant pigment. With it, by the use of various pigments, other colors may be obtained.

If the paints used in the scenery in theaters, opera houses and other places of amusements were painted with non-combustible paints the danger from fires and the loss of life would be materially reduced.

Tungstate of soda has been used in photography in the various gelatine processes with more or less success.

There are many other uses to which the compound is put; but those named are the principle and consume the largest quantities.

Tungsten may be detected by the following methods.

1. Solutions containing it give a blue precipitate with muriatic acid and zine.
2. When tested with ammonium sulphide, and afterward with dilute hydrochloric acid, a brown precipitate is obtained.
3. When fused before the blow pipe with lime and microsmic salt a blue bead is produced.

Funnygrafts.

We do not know whether the recipient of the following letter felt amused or enraged on reading it. It was written by a Buckinghamshire farmer to a distinguished scientific agriculturist, to whom he felt under obligation for introducing a variety of swine: "Respected Sir—I went yesterday to the fair at A—. I found several pigs of your species. There was a great variety of beasts; and I was greatly astonished at not seeing you there."

A good looking old German with long hair sat down, or rather up, in the barber's chair, and was asked whether he would have his hair shingled. He replied: "Mein Kott, no! I want some hair koot off. Vy woot you put zum shingles on it because?"

TO PRESERVE GRAIN.—A new method of preserving grain has been recently discovered in France which quite transcends the old method of preserving it in pits. A sheet-iron cistern which occupies little space, and which holds nearly 300 bushels and is worked by an air pump, with a pressure gauge to indicate the degree of vacuum comprise the whole hermetic apparatus of preservation. With this apparatus there have been some curious experiments made of late at Vincennes. After a detention of seven months, the wheat, the flour and the biscuit inclosed in the apparatus were withdrawn in a perfect state of preservation. Bread made from the flour inclosed in it turned out to be of an excellent quality. The cost price of preservation is much less than storage in a granary. The cylinders are as impermeable as pits, require no masonry, and can be placed anywhere. Wheat is safe from fire, fermentation, insects and cryptogamic vegetations. One very important effect which results from the numerous and continuous experiments, made as well by the inventor as by a committee, is that the vacuum not only kills the parasitic insects and prevents vegetation, but dries the grain at the same time. This is a valuable device, and should be extensively used.

Smith's Patent Spring Silk Reel.

AN IMPORTANT ENGLISH INVENTION.

John Smith, Esq., proprietor of the Grove Iron Works, at Carshalton, Surrey, England, is the inventor of a spring silk bolting reel, a cut of which we present on this page.

In these days of bolting, and purifying, and repurifying and separations, our readers will undoubtedly be interested in any invention that may be an improvement on devices now in use, no matter where the invention may have been made. Smith's Patent Spring Silk Reel is in operation in the best mills in Great Britain, and has lately been introduced in this country, where it bids fair to become a favorite device.

The object of this improvement is to bring the whole surface of the silk into use, which allows the meal to slide instead of being carried round on the ribs and being dashed down, which causes the "greys" and other deleterious matter to pass through the silk into the flour. It gives a gentle elasticity or spring to the silk, and thereby the life of the silk is much increased through the sliding action instead of the dashing action which cuts the silk near the ribs, consequently destroying it before it is half worn out. The dressing capacity is also increased through the sliding and elastic action, which is so necessary for free and neat dressing. The springs can be attached to any ordinary existing silk reel.

Milling Talks.

[Written for the UNITED STATES MILLER.]

There are plenty of things that a miller knows, or believes, but which he forgets about in the great hurry of business or petty details taking his attention. Many a time a miller visiting a neighbor sees something that he fully intends to put in for himself, but which he forgets about when he gets home. So in these talks there may be some things that will appear familiar, as well as some that are new; but all may be considered useful, and each reader must not take all for himself especially. One of the greatest troubles with which the miller and every other practical man has to contend, is miscellaneous advice, which, however it may have been useful and profitable in one case, or in many cases, may not just fit his conditions. Now, for instance, take the question of dress. A miller will be told by some very practical fellow, that the proper dress for a 4-foot stone, hard spring wheat, for old process, should be $4\frac{1}{2}$ inches draft, seven furrows to the quarter, and $\frac{2}{3}$ land. This will be all right enough for moderately open stone at a speed of 140, but when it comes to close stone it is not right at all, because a close stone will need to have more furrow than an open, other things being equal; and if the speed is greater there should be less draft, other things being equal. There is no prescribing for a patient unless you have all the symptoms.

** As regards the question of heating—hard, flinty wheats will need more heating than those which are soft and moist; and yet some agent for a patent duplex elliptic nickel-plated wheat heater, in his eagerness to sell his contraption, will give the same advice to all in the matter of heating, with the result of spoiling no end of flour.

** Some of these practical men, so-called, get way off their latitude, in the matter of power and its transmission. Nothing is so deceptive and yet nothing is so seductive, as leverage.

** In planning a building, remember that the more nearly square it is on the ground plan, the less it will cost per square foot of area ("other things being equal," as in so many cases). Suppose we have a mill 60x40 feet; there will be 200 feet of wall length to 2400 square feet of floor space. Now, if we have the same surface in a building 24x100 feet, we will have 248 feet of wall; while if we make the plan about 50 feet square we will have only 200 feet of wall and 2500 square feet of floor surface. This principle of course applies to the walls of all kinds of buildings, as dwellings, &c., and it is worth remembering. Going a little further in the same direction of saving wall cost—a building having several projections, no matter how slight they may be, wastes wall not only by having too much wall for the floor space, but these corners are more costly to build than plain straight walls. The more nearly cubical a building is, the cheaper it can be built, unless the dimensions are such that the timbers must be cut of some extra or odd length.

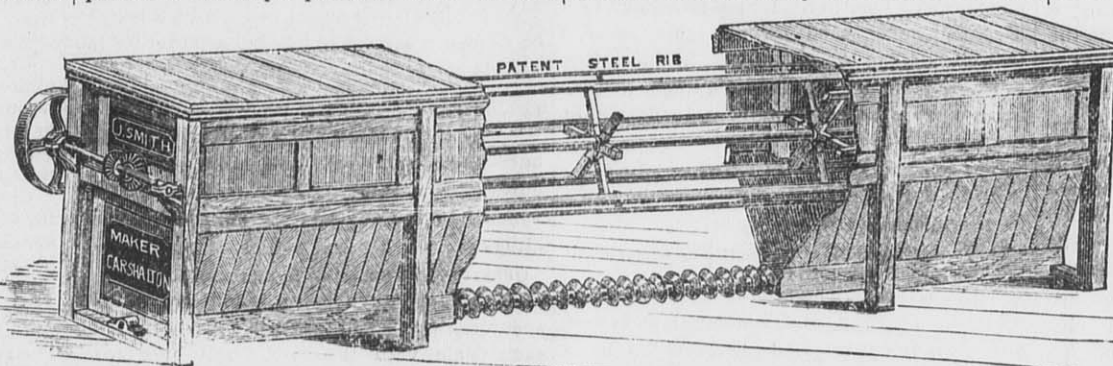
** While I am on the subject of walls, I may as well call attention to the fact that hollow walls are cheaper, stronger, warmer and safer than solid ones. That is, a 16 inch wall, composed of one 4-inch wall inside of an 8-inch outside wall, and with 4 inches air space, will be stronger, better and warmer than a 12-inch wall built solid. There must be care taken to have bond made between the two walls, by headers laid sufficiently close together, every 4 courses; or by vertical curtains of brick work dividing the space between the walls into vertical compartments.

** It is better that windows be set nearly flush with the outside of the building, than that they be set back some distance; for flush windows give the most light in the building.

** In the matter of power, very few men realize how much profit there is in saving waste. We will suppose that the engine in the 100-barrel mill—say taking 40 horse power—is of the plain slide-valve type, taking about 40 pounds of steam per horse power per hour, and that the boiler is of the old-fashioned kind, without a feed heater, and making only about 6 pounds of steam per pound of coal consumed. This will give us 1600 pounds of steam needed per hour to drive the engine, requiring 266 $\frac{2}{3}$ pounds of coal per hour, or 6400 pounds per day of 24 hours. There are plenty of mills having this record, that is, taking 64 pounds of coal per barrel of flour. We will suppose that the engine was of a good type—such as any one of those shown at the Cincinnati Millers' Exposition of 1880—having automatic cut-off and producing one horse power for every 25 pounds of steam; and that the boiler was of a good type, making 8 to 10 pounds of steam per pound of coal. We will

for one size and kind of middlings, and give it just that kind, there are very few machines that cannot be made to do good work upon them. In other words, grade the middlings and scalp out the flour, before purification.

** To get middlings of one size and shape with burrs is quite possible, but it cannot be done by slouchy work. Eternal vigilance and long-timed skill are needed. The skill comes in choosing the dress to suit the speed and texture of the burrs, and the quality of the grain to be worked. The vigilance comes in seeing that the burrs are in perfect face, and perfect running and standing balance, and that there is no back lash. Go right back to the first place where back lash may be checked—at the engine; and see if the fly wheel and the governor are just right. There ought to be plenty of fly wheel; and the governor ought to be adapted to the weight of the fly wheel and the type of the engine. There are some governors that are too sensitive for the engine as it stands, and they may with advantage be changed for those which are suitable. Having got the speed of the engine as nearly right as you can, with the advice of a competent engineer, see that the belts and gears are right. If the belts slip, or if the gears be loose and irregular, there will be back lash. To see whether the belts slip—or whether if they slip much, for there will be some slip wherever belts are used—count the revolutions of the main driving pulley, and those of the burrs and other revolving parts of machinery. Count how many revolutions there ought to be for each machine, according to the diameters of the pulleys; and then by actual count for a few minutes see whether many revolutions are lost.



SMITH'S PATENT SPRING SILK BOLTING REEL.

need in the first place only 1000 pounds of steam per hour instead of 1600; and to get this 1000 pounds of steam per hour we will need only 100 to 125 pounds of coal per hour instead of 266 $\frac{2}{3}$. That is, in 24 hours there will be needed 2400 to 3000 pounds of coal instead of 6400, quite a difference; and yet such differences exist on all sides, and this is not an exaggerated case. The old-fashioned boiler and engine take 213 per cent as much fuel as the better types, and the extra fuel bill for 3400 pounds of wasted fuel will amount up to from \$5 to \$8 per day, or \$1500 to \$2400 in the course of the 300 working days in a year.

** In arranging the cleaning machinery, it is best for some reasons that there be as few elevations as possible; that is, that the weight be taken once up to the attic, and after being separated, dropped down to the smutter, then to the scourer, brush machine, and so on to the grinding floor. There are, however, cases where this is not convenient—as for instance where the mill is only two stories high, or where, it being a small custom mill, it would not be convenient for the miller to run up and down stairs frequently to adjust the cleaning machinery.

** In arranging for gradual reduction, there is no use in expecting to get each berry after the first break broken right down the middle, as though cut lengthwise with a knife; and there is no use in expecting to get anything like this. If the burrs, or the rolls, or the iron discs, chosen to effect gradual reduction, are fed grain of all different sizes, and degrees of hardness, they cannot turn out good reduction. If given "straight" wheat they will do better than if they get mixed. If they are given berries that are nearly of a size, by reason of having been graded before the first break; if the wheat is straight, and the dress or corrugations are adapted to that kind of wheat, and the distance is properly regulated, they will do good work, and make a small amount of break flour, of a pretty low grade, and of fine sharp middlings.

** Carry this principle on further to the purification. If a purifier is loaded down with middlings of all sizes and shapes, from which the flour has not been taken out, you must not expect to get good purification, no matter whose purifier you may have. But if you clothe your purifier and arrange the draft

If over two per cent are lost for each change of belt, you may conclude that there is too much slip, and must look about for the means of preventing it if possible. To prevent slip, first see that there is sufficient tension in the belts and that the joints are square and true. Then see that the belts are clean and not either greasy or dry. If they are leather belts, and dry, give them all the castor oil they will take up. Then see whether the belts have sufficient arc of contact—that is, sufficient wrap around the pulleys; and if they have in any place less than 90 degrees and there is chance of giving them more, by means of idler pulleys, put in the idler, *not to strain the belt*, but simply to give it more wrap. It may be that the slip is caused by too narrow a belt, in which case, a wider one must be placed in, even if it necessitates a wider pulley.

American Currency of the Future.

A PAPER READ BEFORE THE BANKERS' CONVENTION.

What the future currency of the United States will be is a very proper and pertinent inquiry. It derives significance from a variety of causes. It is an easy matter to recall the various kinds of currency and the various changes of currency which have obtained in the past. History treats of these mutations as a whole and in detail, and the only value of a reference is to show by comparison the superiority of our present system of currency, and to draw from the analogy of progress the fair inference that while we have not maintained a perfect currency, we may reasonably desire and expect still further improvement. We take it that no one wishes to go back to the old issue of State banks based on good, bad and indifferent securities, with the varying rates of discount and inconvenient sources of redemption. This is a condition of things not to be thought of for a single moment. The present National bank system is too complete and convenient to be surrendered except for something better.

As the charters under the National Bank Law are for twenty years, many of the banks will soon be called upon to renew them or to retire from the system and reorganize under State laws, or go out of existence. Just what the banks will do, we will not attempt to predict, though it is probable that most of them will renew their charters, despite the fact that the

highest rate of interest on the bonds put up for security is now $4\frac{1}{2}$ per cent and on the bulk of such deposits it is only $3\frac{1}{2}$ to 4 per cent against 5 and 6 per cent until recently, while no relief in the way of modified taxes or increased circulation has been experienced. It is barely possible that hereafter the number of banks declining business under the National bank system will more than offset the number of new organizations.

It may be set down as an incontrovertible proposition that the future currency of the country will consist, as in the past, of coin and paper. We take it that the coin currency will be composed of the same metals as now. They are naturally adapted to the fields they occupy, and any attempt to change or reverse them can only result disastrously. The gold is needed in the settlement of large balances whenever coin is required, and silver can never take its place on account of its greater bulk. Silver is needed in the smaller transactions of every-day trade, where it is really more convenient than gold. The small coins must of necessity be a cheap metal, and the present alloy probably answers the case as well as any other. The coinage of gold should continue free as now, and the coinage of subsidiary or token coins should forever remain under the control of the Government.

That there will be a change in the paper currency of the country is quite probable. There ought to be. We have both Government and National Bank paper, and the proportions are about equal. Either the banks should issue all the paper money, or it should be left entirely to the Government. Practically the Government does issue all the paper money, but the issue is based on security put up by private capitalists. While this security, is undoubtedly, the best in the country, it is after all but a credit. One promise to pay is simply issued against another promise to pay. The bond put up for circulation is an asset of the owner, but a liability of the Government issuing notes against it. It is true that the credit is backed by the resources of the country, which at best is an intangible asset, and, stripped of all hyperbole, simply means the power of the Government to tax the people for the payment of the debts of the country.

It is a fair question to ask, what is to be put up as security for circulation after the United States bonds are called in and canceled? At the way the debt is being reduced, this question will have to be settled in a few years, at the outside not over twenty years, and possibly within fifteen years. There is no reason for the perpetuation of the debt beyond the first-named period. The bonds out of the way, other securities must be availed of, or there must be a direct issue of paper money by the Government. The people will have this kind of money. The vast business of the country demands something as portable as paper for settling domestic exchanges. We maintain that the Government should alone issue this paper. It should only be issued against deposits of specie. It can safely issue \$100,000,000 for every \$40,000,000 of specie. The true solution of the silver question is for the Government to take the ingots from the mines at their commercial value and issue notes against the same, receivable for all debts, public and private, and redeemable in gold coin at the option of the holder.

Specie is the only true basis for paper issue, and no better basis is known. The silver mining question is peculiarly American—that is, no great commercial nation has an interest of the kind of such large magnitude. It deserves to be fostered to the extent named. It is a safe proposition for the Government, as silver will ever have an international commercial value equal to the average price paid for it. Something will have to be substituted as a basis of circulation for the United States bonds so rapidly being canceled, and silver is just the thing needed. It is always salable, and can at any time be converted into gold to make good any decrease in the Government reserve of that nature.

The money thus issued by the Government should be free from taxes of all kinds. That would make it the most popular of all kinds of money, and give it universal circulation throughout the country. Money should be as free as air, so far as any power to tax it is concerned. It is to the financial world what air is to the physical world—an absolute necessity. Worn notes where a fraction over 50 per cent is presented should be redeemed at par, and all other fragments discarded as worthless. This would ensure good money and clean. Under such a system banking would be free to all, and the note holder would be perfectly protected.

Milling Questions and Answers.

BY EPHESUS.

[Written for the United States Miller.]

QUESTION—What are the objections to the ordinary method of placing magnets in spouts?

ANS.—As magnets are placed in spouts, they must be taken out all at once, and the adhering particles of iron and steel removed. During this time any metallic pieces are at liberty to pass into the burrs and reels and there cause damage.

QUESTION—How may the trouble, arising from the lack of protection during the time that the magnets are being cleaned, be overcome?

ANS.—The best way to insure that the spouts shall at all times be occupied by magnets, is to have a double gang of magnets, each half in a separate board, hinged like a lid. All that is necessary is to raise one of the hinged gangs at a time and clean it off, the other guarding the passage. This is much better than stopping the flow of the grain or taking out each magnet separately.

QUESTION—Where should the exhaust boxes, stove room and exhaust fan be placed?

ANS.—The exhaust boxes, stove room, and exhaust fan, should be outside the mill.

QUESTION—How should lights be protected?

ANS.—All lights should be covered with glass and wire gauze covering, to lessen the fire risk.

QUESTION—What should be the color of good flour?

ANS.—Good flour should be white with a slightly yellow or straw color tint. Very white flour having a bluish cast or black specks in it, is not good.

QUESTION—What is the test for life in flour?

ANS.—The test for life in flour is to throw some of it against a dry, smooth, perpendicular wall, and if it sticks in a lump it is good; if it falls loose it is bad. If it is squeezed in the hand it should retain the print of the fingers.

QUESTION—How may flour be tested for barytes, gypsum, fine sand, or chalk?

ANS.—Flour may be tested for barytes, gypsum, fine sand, or chalk, by making a fine paste of it, from one ounce of flour and ten ounces of water, then slowly add an equal measure of sulphuric acid, and stir. The pure flour will dissolve, and the mineral adulterations above named will settle to the bottom, all except the chalk, which will cause effervescence. Care must be taken to pour the acid slowly.

QUESTION—How may wheat in store be kept from fungus growth?

ANS.—Wheat in store may be kept from fungus growth by giving it plenty of air.

QUESTION—What is the effect of too much moisture in wheat?

ANS.—If the wheat is too moist, it will gum up the stones and paste up the bolting cloths.

QUESTION—What is the effect of too little moisture in wheat?

ANS.—If the wheat be too dry, the bran will be brittle and apt to have the flour specky.

QUESTION—Which takes least land surface, hard winter wheat or spring?

ANS.—Hard winter wheat takes less land surface than spring.

QUESTION—What kind of furrows should winter wheat have?

ANS.—Winter wheat should have wide, shallow furrows.

QUESTION—How should stones be dressed for buckwheat?

ANS.—For buckwheat grinding the stones should be dressed with a pointed bill or pick, and not with a chisel-edged tool.

QUESTION—How may soft spots in burrs be remedied?

ANS.—Soft spots in burrs may be remedied by digging out the spots and filling up with mill-stone cement, composed of powdered burr stone, chloride of magnesium, and calcined manganese. Or the whole block may be dug out and a new one put in, but this is very difficult to do.

QUESTION—How may soft wheat be ground when it contains garlic?

ANS.—When soft wheat contains garlic, the stones should be raised high, if the wheat is run in before it gets dry. It is much better to dry the wheat before grinding, as then the garlic becomes shriveled and is more easily taken out.

QUESTION—How may picks best be tempered?

ANS.—Picks may be best tempered with a lead bath, oil being used to cool, instead of water; and the pick then being put in potash or soda water. Charcoal must be sprinkled over the melted lead.

QUESTION—Can rye flour be improved by purifying?

ANS.—Rye flour may be improved by purifying, regrinding, and rebolting the middlings.

QUESTION—What caution may be given in reference to the speed at which a smutter or a scourer should run?

ANS.—A smutter or scourer should be run at the speed designated for it, by the maker, unless, by trial, it is found to be doing bad work at that speed. But it will generally be found that the makers of these machines,

having fierce competition, have experimented with the speeds until they can tell just what speed will give the best results.

QUESTION—What precaution should be taken in setting up a vertical smutter or scourer?

ANS.—In setting up a vertical smutter or scourer, it should be set level, all parts made tight, the machine fastened to the floor, and the frame braced against the motion of the shaker, if necessary. The mouth of the discharge pipe should not be closed up or choked; the dust spout should be at least as large as the fan discharge, and all curves should be upon a circle not less than the fan circumference.

QUESTION—Is American burr stone in any degree equal to French?

ANS.—American burr stone, so called, bears no comparison with the French.

QUESTION—How should the joints in burr stones be made?

ANS.—The joints in burr stones should be made with burr cement and not with plaster, and they should be true all the way down through the depth of the blocks, and not merely true on the face, widening out to a decided crevice.

QUESTION—What are the uses of Cologne stones?

ANS.—Cologne stones will do for grinding soft corn, mustard seeds, and for scouring grain.

QUESTION—What precaution should be taken in buying a millstone bush?

ANS.—In ordering a millstone bush, see that it has adjustment not only in and out of centre, but also in and out of plumb.

QUESTION—How should a red staff be made?

ANS.—A red staff should be made of several pieces of cherry, say 5 pieces of inch stuff, trued to a glue joint, and then both glued and screwed together. It should be kept in a case and never used for any other purpose than for staffing the millstone. In doing this precaution should be taken not to get its face injured by contact with the ragged skirt of the burr.

QUESTION—How should a tram pot be made?

ANS.—A tram pot should be made with a moveable centre adjusted by screws.

QUESTION—How does the quality of wheat affect the question of burr speed?

ANS.—Burr may be run faster on soft, damp wheat than upon hard dry material, as bran is not so easily cut up; and the effect will be to clean the bran better.

QUESTION—What are the advantages of the centrifugal flour dresser?

ANS.—The centrifugal flour dresser requires less cloth for a given capacity, and does not get clogged up, as the ordinary reel does, in warm weather; and the meal is separated according to the weight as well as according to the size of the particles. Any particles which may have been flattened by the rollers get broken in the centrifugal.

QUESTION—How does the water influence the feed?

ANS.—The feed should be lighter upon a cold day than upon a warm one.

QUESTION—Which requires the most furrows, corn or wheat?

ANS.—Corn requires more furrows than wheat.

QUESTION—Which requires the most dressing, edge built or face blocks?

ANS.—Edge blocks require less dressing than face blocks.

QUESTION—What should be the difference in the furrows for corn and for wheat?

ANS.—For corn the furrows should be narrower and deeper than for wheat.

QUESTION—What may be said about edge blocks compared with face blocks.

ANS.—Edge blocks are sharper than face, grind more rapidly, take less power to do a given amount of work, and seldom glaze.

QUESTION—How may a burr be gradually changed from old to new process?

ANS.—One way is to cut narrower furrows between the old one and gradually allow the old ones to wear down until the furrows are even all over the stone.

QUESTION—Which burr is the most difficult to clean, that from hard wheat or from soft?

ANS.—The bran from soft winter wheat is harder to clean than that from hard.

QUESTION—What is the best material for spouts in mills?

ANS.—About the best material that can be used is round tinned pipe, which is cheaper than wooden spouts built by the millwright, and tighter and cleaner. Besides this, iron spouts do not act as lodging places for sparks.

QUESTION—What are the advantages and disadvantages of the germ?

ANS.—The germ is supposed to discolor the flour. It is of a bright yellow color, but does not make the flour look dirty, as bran does. It has these advantages, that it is highly nutritive, retains moisture, and renders the bread better on this account, and it has a sweet and agreeable flavor. In fact, there are many infants' and dyspeptics' food made almost or entirely of germs. But as long as the yellow color is objected to by the buying public, mil-

lers had better keep the germ out of the flour.

QUESTION—Can roller frames be adapted to answer for small mills—say of less than 100 barrels per day capacity?

ANS.—Double roll frames have been very recently so arranged that the wheat passes through one pair of rolls, then gets a separation, and then goes to the other pair of rolls.

QUESTION—How may the roller system be simplified so as to render it practicable for small mills?

ANS.—Instead of reducing the middlings with stones they may be run on rolls, and instead of making two grades of middlings they may be thrown together and reduced on the same set of rolls, and if it be desired to crush some portions of them coarser than the rest, they may be crushed on different sets of rolls, or on the different sides of the same double set, and then thrown into the same reel and bolted together. This will save one conveyor, reel, and elevator.

QUESTION—How many rolls will be necessary for a mill of 75 barrels capacity per 24 hours?

ANS.—For 75 barrels per 24 hours there will be needed four single sets or two double sets of grooved rolls for the breaks, and two single or one double set of smooth rolls for the germs and middlings. This is really an incomplete outfit.

QUESTION—Need there be any difference in size and arrangement between a roller and a burr mill?

ANS.—There need be little difference between roller and stone mills, in regard to size and arrangement of machines. Roller mills will take less room for the granulation, but they generally have more for the cleaning and purification; so that it will be about the same in the end.

QUESTION—How many horse-power will be needed for making 450 barrels per day, in new process roller mill?

ANS.—In a new process roller mill, there will be needed from 200 to 225 horse power for 450 barrels per 24 hours.

QUESTION—How many pairs will be needed for a 450 barrel mill?

ANS.—For making 450 barrels per day with burrs there will need to be 11 sets of 48-inch burrs on wheat (taking 8 bushels per hour each, with a hundred and sixty turns) and 5 on middlings.

QUESTION—How may germ be removed?

ANS.—One way is by smutters and by scourers, which will take the germ out at the same time with the furz. But this comminutes the bran and is apt to make the flour specky. Another way is by the ending stone, and spares the bran on the side of the berry; but then this does not take out the crease dirt, and is apt to waste good stock. Another way is by breaking the berry open length-wise by rolls or disks, which will crack without grinding.

QUESTION—Which makes most first break flour, sharp or round fluted rolls?

ANS.—The sharp rolls often make the least first flour but do not loosen the germ so well as the round ribs.

QUESTION—What are the points to be borne in mind in taking out germ?

ANS.—In taking out germ try to get the germ and crease dirt out as soon as possible after cleaning, to make as little flour as possible; and to cut or break the bran as little as you can.

QUESTION—What is desirable in tightening purifier cloths?

ANS.—In straining purifier cloths, it is desirable that they be stretched both length-wise and cross-wise, and while the machine is in motion.

QUESTION—In making flour what are the requisites?

ANS.—In making flour the requisites are that the flour be clear, lively and granular; the quantity of wheat required small, and the cost of manufacturing low. The expenses including interest, wages, insurance, etc.

QUESTION—What fault is an old process miller likely to commit in making new process flour?

ANS.—An old style miller will be apt to feel the chop, as it comes from the burrs or rolls, and unconsciously bring the burrs or rolls closer together, because the result seems too coarse. This, of course, will disarrange the entire work of the mill.

QUESTION—Which take the most purifiers, stone mills or roller mills, and why?

ANS.—Roller mills take more purifiers than burrs, not because there is more bran and dirt in the middlings, but for the same reason that white sheep eat more than black ones, because there are more of them.

QUESTION—What is the effect of uneven stones?

ANS.—The effect of uneven stones is to produce dark and specky flour.

QUESTION—What is the effect of having the furrows too shallow?

ANS.—If the furrows are too shallow the chop will be hot, and damaged by too close grinding.

QUESTION—What is the effect of a low spot in a stone?

The effect of a low spot in a stone is to make the grinding uneven.

QUESTION—How is greasy chop produced?

ANS.—Greasy chop is produced by low, close grinding under the old method.

QUESTION—What is the effect of too close and low grinding by the old process with burrs?

ANS.—The effect of grinding too close and low, under the old process, is to produce greasy chop.

The Varieties of Steel.

The following correct definitions of the different varieties of steel are by William Metcalf, of the Crescent Steel-Works, Pittsburg, Pa.

Originally, the word steel was applied only to iron which contained such quantities of carbon as would cause hardening when the red-hot iron was cooled suddenly.

This definition still applies, but, in addition the term cast-steel applies to all of the products of the crucible, the Bessemer converter, and the open-hearth furnace, whether such products are too low in carbon to harden or not. The steels that are not cast-steel are known in the market as blister steel, German steel, shear steel, and double shear steel.

Blister steel is made by heating bars of wrought-iron, bedded in charcoal, in hermetically-sealed chambers. The carbon of the charcoal penetrates the hot iron, converting it into a crystalline mass of crude steel; large blisters rise on the surfaces of the bars, giving the name blister steel to this product.

German steel is blister steel rolled down into bars. It is used mainly for tires and common spring, but is being rapidly superseded by the cheaper grades of cast-steel.

Shear steel is made by taking a high heat on blister steel and hammering it thoroughly. Double shear steel is made by cutting up shear steel, piling it, heating it, then hammering again. The best shear steel is made from the best wrought-iron. The shear steels are very useful on account of their toughness and the ease with which they can be welded to iron, and, when of good quality and well worked, they will hold a very fine edge.

Crucible steel is made by melting in a crucible either blister steel, or blister steel and wrought-iron, or wrought-iron and charcoal, or wrought-iron or scrap steel, or in short, a great variety of mixtures, which depend on the quality of steel to be produced.

Crucible steel can be applied to any purpose for which steel is used. Generally, it is better than any other steel—that is to say, crucible steel made by melting blister steel and tempered to suit by mixing iron of the same grade in the crucible is always better than German or shear steel made from the same blister.

Bessemer steel is made by blowing air through melted cast-iron, thus burning silicon and carbon out of the cast-iron. After the silicon and carbon are burned out, melted spiegeleisen or ferro-manganese is added to the charge. The carbon in the spiegel re-carbonizes the steel to the desired point, and the manganese unites with and removes the oxygen which the air used leaves in the steel.

Open-hearth steel is made by melting, in a very hot furnace, a charge of pig-iron. To this melted iron, which is called the "bath," is added either wrought-iron, or scrap steel, or iron ore, and the whole is kept hot until all is melted. The wrought-iron, or scrap, or ore reduces the carbon and silicon in the bath to such proportions as are desired in the steel.

Bessemer and open-hearth steel are much alike in quality. They are used mainly for rails, boiler plates, ship plates, bridge and other structural purposes and machinery. The better qualities are also used largely for springs. The best spring steel, like the best tool steel, is simply that which is made from the best material. Quality of material, chemically speaking, being equal, the best spring steel is that which is made from crucible cast-steel, as the crucible process is less crude than either of the others.

Hints to Boiler Tenders.

S. Risley, M. E., President of the Canadian Board of Steamboat Inspection, has issued the following code of rules for the guidance of those having steam-boilers in charge:

1. Getting up steam.—Warm the boiler gradually. Steam should not be raised from cold water in less than four hours. If practicable, light the fires over night. By getting up steam too quickly the boiler will soon be destroyed.

2. Firing.—Fire regularly. Keep the sides up, and use the slice gently and as seldom as possible.

3. Feed water.—Let the feed be regular and constant.

4. Glass gauge and try cocks.—Keep the glass free, and try the gauge cocks every fifteen minutes.

5. Safety Valves.—Lift each safety valve at least once a day, and always before getting up steam.

6. Low Water.—Put out the fires by drawing them or throwing ashes on them. Never use water. Low water should never occur.

7. Blowing off the Boiler.—Don't blow off by steam pressure; let the water run off if possible. See that the fires are all out.

8. Boiler Purgers.—Never use any compositions to keep down incrustations unless supplied through feed pump.

9. General Rules.—Keep the boiler clean inside and outside and free from leak. Never throw water in the furnace. Under high pressure raise the safety valve gently. Lower the fires, or, if necessary, stop the engine when foaming to find the water level.

Proceedings of the Annual Meeting, Michigan Millers' State Association.

GRAND RAPIDS, Sept. 9, 1881.

At the opening of the convention at 11 a. m. the Secretary, Frank Little, of Kalamazoo, said:

In calling the convention to order I regret to announce that President Merrill, your presiding officer, is confined at his home in Kalamazoo, by severe illness, and will not be in attendance at this time.

I may say, that Mr. Merrill has been looking forward with great interest to this meeting, and has had an earnest desire to be present and participate with you in your deliberations, but Providence has otherwise determined, and you will please choose a President pro tem.

Mr. Jacob Barnes, of Traverse City, was appointed to the chair.

Mr. Barnes, on taking the chair, made some appropriate remarks expressing his regret at the absence of President Merrill.

The proceedings of the last meeting, held May 27th, '81, were read, and after a spirited discussion, in which the affairs of the National Association were freely commented upon, the minutes, as read by the Secretary, were adopted.

Adjourned for dinner.

AFTERNOON SESSION, 1:30 P. M.

The following resolution, offered by Mr. Barnes, was unanimously adopted:

Resolved, That this association request the President and Secretary not to transmit any further funds to the Secretary or Executive Committee of the Millers' National Association until a member of the Executive Committee from Michigan shall have had an opportunity to examine the affairs of such National Association, and the condition and relations of the Michigan Association, and report to the Millers of Michigan.

Messrs. Crossman, Miller and Reynolds, of Lansing, were introduced by Mr. Rice, of Portland, and an informal discussion was had upon the subject of mutual insurance of mill property, but no formal action was taken.

The Secretary announced that articles of association, in conformity to the act, had been signed by the requisite number of corporators at Kalamazoo, and it was also understood that a company had been organized at Lansing of like character, but not under the immediate auspices of the association.

The Secretary, Mr. Little, then submitted the following report:

Mr. President and Gentlemen:

One year ago at the request of the Secretary of the Millers' National Association, an attempt was made to revive the work of the Michigan Millers' State Association.

A meeting was called at Kalamazoo, September 10th, 1880, which was not largely attended. After a full interchange of views upon the subject, it was decided to make an effort to raise the amount of money claimed to be due to the National Association.

Inasmuch as the former officers had ceased to exercise any control over its affairs, new ones were chosen to fill the several positions. The books of record and the files of the association as kept by the former Secretary, Mr. Hibbard, were not available, and have but recently come into the hands of your present Secretary. They are important mainly at this time, to determine, if possible, the balance remaining in the hands of Mr. Hibbard, and due the association. I find among the papers a statement of account showing receipts and disbursements made up by Mr. E. L. Crow, who seems to have acted at times in the capacity of Assistant Secretary. According to this statement Mr. Hibbard is now owing your association a balance of \$487.21.

Among the various items of disbursements for incidental expenses of the association, I find the following:

Feb. 20, 1878.—Cash paid C. L. Crow for his services four months at \$100 per month.....	\$400 00
Nov. 8 1878.—For services Millers' Association from June 20, 1878, to November 8, 1878.....	680 00
" " Expenses to Milwaukee.....	14 50
" " Six days in Nov. 1879.....	20 00
Total paid Mr. Crow.....	\$1,114 50

In a recent letter to your President, Mr. Merrill, the late Secretary and Treasurer, Mr. Hibbard says that he hopes soon to settle up his account with the association.

The transactions mainly of the association for the past year relate to the attempt to collect funds for the National Association, and the preparation and securing the passage of an act authorizing the formation of Millers' State Mutual Fire Insurance Companies.

The millers of the State as a general rule, were not enthusiastic in the matter of paying assessments, and we are led to conclude that they fail to appreciate the benefits to accrue from a paid-up membership in the National Association.

As the National has recently adopted the policy of dealing direct with the millers of the country, ignoring wholly the State organization, we are relieved from much trouble, and charges of inefficiency in that direction. Every miller can now determine his own course of action independently; and secure to himself all the benefits to be derived from such connection by paying promptly the assessments made.

I know no reason why Michigan millers cannot maintain an organization, as efficient and advantageous every way, as that of any other industry or profession in the State. Yet,

whatever may be urged in favor of the association of any class of people for mutual benefit, protection, interchange of views and experiences, and the special study of questions involved, it is very certain that little can be accomplished without an earnest, intelligent, self-sacrificing body of workers. You cannot maintain your association by staying at home; never attending or participating in its business meetings, or contributing anything to its support.

I deem it unfortunate, that the very first movement last fall in the attempt to revive the association, was a call for money, which naturally meets with disfavor, where the objects and advantages are not clearly understood.

Many were made distrustful, who otherwise might have become warm friends and active co-workers in the effort. The result of this endeavor will appear in the financial exhibit accompanying this report.

At the request of your President, some time in December and early in January last, a thorough exploration was had of the laws of Iowa, Illinois and our own State in reference to framing a bill to be submitted at Lansing, to provide for a Millers' State Mutual Insurance Company.

The bill so prepared was introduced by Senator Lovell of Kalamazoo county, February 17th, 1881. In due time it passed both houses, was approved by the Governor, and became a law May 19, 1881. A certified copy of the bill is herewith submitted.

The whole theory of insurance upon the mutual plan is, to secure indemnity from loss at the net cost for carrying such risks. Such companies, not being organized for profit to anyone, may be classed as benevolent institutions whose benefits are fully shared and shared alike by all the members. All stock companies have their foundation in the idea of profits to be divided among the stockholders, and so every risk is calculated to be taken at a certain percentage above the actual cost.

It is true, the exact cost upon the mutual plan in any one year cannot be specifically known; and for this reason, there are those who prefer to pay stock rates, and avoid all possible contingencies.

I have in my possession letters from Mr. D. R. Sparks, of Alton, Illinois, and Mr. J. J. Snouffer, of Cedar Rapids, Iowa, Presidents of their respective State companies, speaking in high terms of the advantages of the mutual plan of insurance of mill property as demonstrated in their States; and that under no circumstances could they be induced to go back to the old methods, which had cost them as much again as they now paid.

I quote from an article in the *American Miller*, under date of May 1st, in reference to mutual mill insurance:

"We believe the increase of millers' mutual companies an unmixed good, so long as they are judiciously conducted in reference to the class of mills insured. Thus far, all the mutual companies have effected a very material saving in the cost of insurance. The Illinois company has been in operation over three years and has had but two losses, aggregating only \$5,000. In Iowa the average cost of actual insurance for the past year was 1.38 per cent. Two hundred and fifty-two mills are insured. There were three losses last year, aggregating \$15,278.78."

The Iowa company does not carry a reserve fund, but levies an assessment for each loss. The Illinois company is required by State law to keep a reserve fund of \$10,000.

According to statistics gathered by the *New York Chronicle*, 177 flouring mills were burned in the United States last year. There has not been any perceptible increase of losses for the past five years. It is said that 25 per cent of fires in flour mills can be traced to friction of machinery, while it is believed that of those where the cause is unknown, a large percentage of them originated from the same source. Dust fires and explosions also occur where the burrs are running empty, or from contact with the flame of lamps or open fires.

Every provident miller will see to it, that his risk is reduced to the minimum, and avail himself of all the modern appliances for extinguishing fires.

But no prudent business man will take a large amount of insurance in one company, even were they willing to take the risk; and so both plans can be very fairly compared in the matter of cost by placing part in the mutual and part in stock companies. Then again there need be no rivalry so far as the companies, mutual or stock, are concerned, for in all large mill properties there will be enough to divide among all, making a loss fall comparatively light upon each.

The general success of a mutual company will depend upon its management and the number and character of its members. Like all other enterprises dependent upon popular favor, it must have the confidence and good will of the public interested, or it will certainly fail of success.

A special meeting of the association was called at Kalamazoo May 27, '81, mainly for the purpose of organizing a company under the Act be forementioned; but the attendance was so limited that it was decided by those present to defer action until this meeting. Some time in July a printed circular was received from Lansing, notifying the millers of the State that a company had been organized there and that they were in readiness to receive applications for insurance.

I am officially advised by the Commissioner of Insurance that articles of association for the Lansing company were filed in his office July 1st, '81. What further progress this company has made I am unable to say.

So far as relates to the company that it was proposed to organize at Kalamazoo at the May meeting, a charter and by-laws have been

drafted, the requisite number of corporators have signed an agreement, and it is for the millers to determine whether they will go on and perfect the organization. These papers can be read if desired.

The law requires five weeks publication of notice of intention, and the articles of association to be submitted to the Attorney General and the Commissioner of Insurance for their approval; also there are all the necessary blanks, policies, etc., to be prepared and printed. This will involve some expense, preliminary to the taking of any risks, which should be provided for.

In view of the fact that the company cannot get ready to open books for business until nearly the close of the fiscal year, I would recommend that no policies of insurance be issued until after January 1st next; meantime such as desire to become members can hand in their names, and you can in this way start off at the outset with a good strong company.

Such as have already signed the charter, with those who are now ready to signify their willingness to become members, can before they disperse confer together and choose a temporary Board of Directors, who can designate the other officers of the company, so that the work of organization may be conducted properly and by authority.

The outlook for the coming winter is one of probable privation to many people, and advanced prices for all agricultural products. A terrible drought has been general throughout the Northwest, and has scourged the country beyond precedent of recent times.

It is now clearly established that the yield of corn will not be half of the average crop; there will be no buckwheat; late potatoes are nearly ruined, and as a general rule, herbage in pastures and woodlands has long since disappeared.

The wheat crop of Michigan for 1880, as reported to the State Department at Lansing, was estimated at 30,526,567 bushels, an average yield of 17 29-100 bushels per acre. The returns from 77 townships of the estimated yield for 1881, shows our present crop to be but a trifle over one-half of that of 1880. From a table of estimates recently prepared by Hon. Wm. Jenney, Secretary of State, I make the following quotation:

"According to these estimates the average yield for the whole State for 1881, will be but a trifle more than nine bushels per acre, and the aggregate product 16,200,000 bushels."

Very respectfully submitted,

FRANK LITTLE,

Secretary Millers' State Association.

The report elicited considerable discussion, especially that portion referring to insurance of mill property upon the mutual plan, which met with general approval. The report as a whole was unanimously adopted.

The question of continuing the association was then taken up, and it was decided to go forward another year.

A committee on choice of officers was then chosen who retired for consultation.

Messrs. Bradfield, Voigt and Hoffman, committee on nomination of officers of the association for the coming year, made report, which was adopted as follows:

President, D. B. Merrill, Kalamazoo.
Vice President, William Hayden, Tecumseh.

Secretary and Treasurer, Frank Little, Kalamazoo.

Executive Committee: E. Bradfield, Ada; Chas. S. Barnard, Niles; J. W. Hoffman, Three Rivers; W. H. McCourtie, Kalamazoo; C. G. A. Voigt, Grand Rapids.

Member Executive Board Millers' National Association, Jacob Barnes, Traverse City.

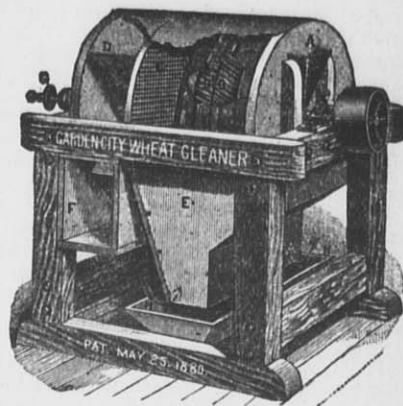
The convention then adjourned *sine die*, subject to call of President and Secretary.

WHEAT HARVESTING.—Wheat cut early avoids waste from shelling and makes whiter flour, but the flour from early cut wheat contains much more starch in proportion to the gluten than the flour from wheat cut after it is fully ripe. The microscope shows that the starch and gluten are not formed in the grain at precisely the same period; the starch cells in the interior of the kernel are filled with starch granules some days before the gluten cells next the bran, are quite full. Hence, wheat allowed to get as ripe as possible to avoid waste, makes, not whiter, but better, because more glutenous flour, than that from wheat cut early. The rather common practice of allowing wheat to stand in the shock until time to thrash, has perhaps the advantage of saving once handling, but if it remains in the field until one kernel in a hundred gets sprouted, irreparable mischief is done to the flour. Wheat taken from the field and secured in the barn, or a well-made stack, as soon as it is dry, will pass through a process called "sweating in the straw," which leaves the grain sweeter and much freer from mustiness, than if it passes through this sweating process in the granary.—Prof. N. S. TOWNSEND, in *American Agriculturist* for October.

We respectfully request our readers when they write to persons or firms advertising in this paper, to mention that their advertisement was seen in the UNITED STATES MILLER. You will thereby oblige not only this paper, but the advertisers.

"BEST in the WORLD."

GARDEN CITY WHEAT BRUSH



Gathmann's patent "inclined bristles" prevents all clogging when the brushes are run close together. This is the

ONLY DOUBLE BRUSH

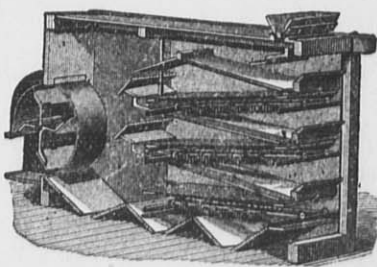
Which can be set up close so that it will

Thoroughly Brush Wheat.

It don't break or scratch the grain. Removes all the dust. Very light running. Send for a circular and prices.

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PURIFIER!



Travelling Cloth Cleaners.

Our improved Purifier has every device requisite to make it perfect, and every one in use is giving the greatest satisfaction to the users. The Cloth Cleaners are guaranteed to clean the cloth better than is done on any other purifier. Send for our new circular.

We are agents for the

BODMER

Bolting Cloth

Which has long been acknowledged as the best made, and which has lately been further improved, making it now *beyond competition*. We make it up in the best style at short notice. Send for prices and samples.

Garden City Mill Furnishing Co.,
CHICAGO, ILL.

(Mention this paper when you write us.)

The International Electrical Exhibition at Paris.

The following is taken from London *Capital and Labour*, of August 17:

"On Wednesday last, M. Grevy instituted at the Palais d'Industrie the first International Electrical Exhibition. The Palais d'Industrie has been divided into two nearly equal parts, one-half being occupied by the French and the other half by foreign exhibitors. England has a quarter of the space allotted to foreigners, the remainder being occupied by the United States, Belgium, Sweden, Russia, Germany, Holland, Switzerland and Austro-Hungary. The objects exhibited are divided into sixteen classes, and of these four promise to be more attractive than any others to the general public: Telegraphy, telephony, electric lightning, and the application of electricity as a motive power.

"The French section includes a lighthouse of extraordinary power; a theatre, which has been specially constructed to display the capabilities of the electric light in its various forms for the illumination of the stage and auditorium; a photographic department, where photographs are taken in various ways by the electric light; and a telephonic room, which is in connection with the opera and two or three of the principal theatres. M. Trouve has a full sized boat of three people driven by electricity in the lake surrounding the lighthouse, and M. Tissandier has a balloon propelled by electricity. The automatic electrical sewing machine of M. Olivier is very elegant and useful. It costs little, and the force generating the electricity can be provided to do ten hours' work at an expense of 50 centimes daily. While the seamstress holds the cloth, she can, if she pleases, be noiselessly fanned. Messrs. Siemens have exhibits in the French, English and German sections.

"In the English sections the post office has a most interesting exhibition. A light and elegant structure, built of telegraph poles, and decorated with wire and insulators, crowned by a superb trophy of Union Jacks and English ensigns intermingled, and other flags and bunting, rivals the tri-color arrangements of the French section. There is also shown a fine historical collection of all the early forms of telegraphy introduced into England by Cook and Wheatstone. Almost as prominent are Messrs. Siemens, who exhibit an enormous trophy composed of a pyramid of coiled submarine cables, surmounted by a buoy of the kind used in laying them, on the top of which is a beacon. They also exhibit their tramway car driven by electricity, which runs from a wooden station on the Place de la Concorde into the exhibition, and a great variety of electrical lines, cables, instruments, and apparatus of various kinds. The electric lighting has not yet commenced, but the British section has made most progress with its arrangements. One of the first among the exhibitors is the Anglo-American Brush Light Company, with an imposing array of elaborate and decorative electric lamps and the necessary machinery for working them. Among the new things is Bright's Fire Alarm Telegraph, constructed to sound the alarm bell whenever the temperature rises above a certain height, and thus act as an automatic watchman. The British Electric Light Company will make a good display with the Brockie and Lane-Fox lamps. The Swan Electric Light, like the Lane Fox, an incandescent lamp, will be employed for lighting up the English post office exhibit and one of the salons. The Silvertown India Rubber and Gutta Percha Company, and the Telegraph Construction and Maintenance Company, send samples of cables laid and now in operation, as well as a variety of electrical appliances. A fine collection of instruments of precision, such as galvanometers, is exhibited by Messrs. Elliot Brothers and Messrs. Reid Brothers. Messrs. Clark Muirhead & Co. send an electric lift, and Mr. Apps the large induction machine constructed for Mr. W. Spottiswoode, President of the Royal Society. Among the English exhibitors, sixty-four in all, are several makers of steam engines for driving the dynamo-electric machines, to-wit, Messrs. Robey, Wallace & Stevens, Ransome, Marshall, and Peter Brotherhood.

"In the American division the Edison exhibit is, of course, very prominent. The two salons which contain it are fitted up as picture galleries, and contain a complete illustration of his system of district lighting in competition with gas, as well as representations of all his inventions and discoveries during the past thirteen years. In the German department electricity is largely applied to pedagogy and military uses. The artillery of the Emperor William gains in precision by the various electrical apparatus which are placed at the disposal of men and officers in that service. An ambulatory telegraph towered above the scientific playthings. From the Belgian section one would draw the inference that at Brussels electricity is chiefly applied to decorative and fine art. The plaster facings, coated over with bronze by electric agency, were very perfect. There is a piece of ancient history in the form of a statue of the late Queen of the Belgians, seated in an arm-chair in an attitude resembling that assumed by Madame Emile de Girardin. When the arrangements are completed for lighting, the exhibition will be opened nightly, and an additional charge of 50c. per head will be made. The illuminations will last from 8 to 11 p. m., and the sight presented by the exhibition when it is fully lighted will be such as has never before been seen in the whole history of the world.

"On September 15, a congress of electricians will meet in Paris, not only to view the exhibition, but to debate several questions of high importance to the scientific world and to the public. It is felt, for example, as a daily in-

convenience, that no universal and intelligible system of light measurement should exist. In England we reckon by so many candle power of illumination, the light of a sperm candle being taken as the unit of measurement. In France the unit is the light of a Carcel lamp; in Germany it is that of another kind of lamp. These differences lead to a vast amount of trouble in estimating the strength of various instruments, which might be easily spared by the adoption of a common unit of measure. An equally important subject to be discussed is the establishment of a universal system of electrical measurement. The interest aroused by the exhibition and the importance of the subject to be discussed will, it is expected, bring together the greatest gathering of famous electricians that has ever been held."

How to Put In Turbine Water Wheels.

BY T. J. ALCOTT.

The first thing to be done in preparing to set wheels, is to excavate wheel-pits (if there be none, or not of sufficient depth), put down mud-sills, and sheet them over with two-inch plank (unless there be rock bottoms). These pits must be from two to four feet in depth, according to the size of the wheel. It should always be borne in mind that too free a discharge cannot be made. The wheels should be set so the bottom will be in tail-water when they are standing. The discharge room for water from pen-stock, should have under the sill, an area measurement of one square foot for each 75 cubic feet of water used per minute. Sills of pen-stock must be of good, sound, durable timber, of ample size, and well framed together, and when placed must be perfectly level and solid. The pen-stock must be supported by proper pillars of wooden blocks or good stone, holding the sills in a permanently level position. The mud-sill or under-foundation must be of a most secure and permanent nature, allowing no chance whatever for any undue settling or any possibility for being undermined. The floor timbers of the flume should be placed in the direction of the current, that the water discharged from the wheel may pass off as free as possible. The deck-sill, or timbers on which the deck or floor of pen-stocks are placed, and on which the wheel-case will set, should be framed into corner posts, and be two inches wider than the posts, so as to leave a projection of two inches on the inside of pen-stocks for the deck-plank or floor to rest on. There should be corner pieces spiked in on the inside of deck-sills to assist in supporting the deck-plank. These form an octagon, and should be the same depth of sills, and three or four inches thick. Where pen-stocks are large (which is very desirable), there should be intermediate sills framed into main-sills, leaving a square of sufficient size to cut the holes through the deck-plank for wheels. When the pen-stocks are completed there should not be less than from twenty-four to forty-eight inches of clear discharge from the lower side of these sills down to the sheeting in the bottom of wheel-pits and the same depth should be continued the entire length of the tail-race, otherwise there will be a loss of head. The floor of pen-stock must be well and tightly laid with good, thick plank. The hole for the wheel's draft cylinder must be cut through this floor (between the trimmers) of a diameter one-half inch larger than the cylinder measure (to give chance to adjust). Plane off the curb of this hole until it is perfectly level, so that the wheel may set exactly level when it is in place. The corner posts of pen-stocks should be rabbeted two inches one way and four the other, to receive the side-plank. This makes the strongest job, and prevents leakage. This will require corner post twelve by fourteen inches, when the intermediate posts are ten inches. When two or more wheels are to be used in the same mill, the pen-stock or flume can be made to receive all the wheels. This will require intermediate sills to support the deck plank. Care must be taken not to destroy the effective force of the water by an insufficient supply into the flumes, or contracted discharge from the wheels. The supply of water into the pen-stocks should be large, so that it will stand as quietly over the wheels as possible, as the effective force of the water is diminished by flowing rapidly into pen-stocks. All that is essential to make them do good service, is to have a place to hold the water, have a good supply of water in the pen-stocks, and a free discharge below, and have the wheels set on solid foundations.

WHEAT SOIL.—The farmer must sow his wheat upon such land as he has, it may be clay or sand, wet or dry, rich or poor. If it be clay, and other conditions are favorable, he may expect a plump, soft berry, and a full crop. If his soil is sandy and other conditions

favorable, the wheat is likely to have a smaller but harder kernel, the quality will perhaps be better, but the quantity somewhat less. If his soil be too moist it will pay to underdrain. Tile drains, two rods apart, and at an average depth of three feet, have doubled the crop and paid the total expense of the drainage in a single year. If for any reason underdraining cannot be practised, no fear of incommencing the reaper ought to be allowed to prevent making a sufficient number of open furrows for surface drainage. The greatest possible inconvenience at harvest time is a poor crop. Black mucky land, after it is drained, may need to be dressed with fertilizers, such as salt, lime, or bone-dust. A dry poor soil needs barn-yard manure.—PROF. N. W. TOWN-SHEND, in *American Agriculturalist* for October.

Flour Milling.

It is somewhat strange that our Western contemporaries, especially those in the milling interest, should find so much to talk about in regard to the mills and their capacity of this city and Brooklyn. While we are willing to grant that there are mills in this country which give a greater production per day than those we have here, yet we are not willing to allow that the systems they employ in their Western mills are better, judging by the flour turned out, than that which is produced here, which is alone the proper criterion. Nor do we know of any mill where the production of flour has been brought to any higher degree; and, in order to "prove the pudding," we will take as an example the Brooklyn City Mills, adjoining the Fulton Ferry, Brooklyn. To start with, we will say that a short time since, on the reorganization of the firm, they decided to improve their already large facilities, which then, as now, were comprised in an immense six-story building, built with a view to careful economy of room. Since the erection of the Brooklyn City Mills, if we are to judge by the output and the reputation which the various brands of this mill enjoy, we feel safe to say that there are few brands of flour now in the market which have a wider sale or which have so long retained their hold on public appreciation.

So much for the product, and now for a few words as to the system employed, which is that known as the "Jonathan Mills Patent Reduction System." In conversation with Mr. E. M. Jewell, Secretary of the Company, in answer to inquiry, he said "that it was working like a charm," and they, after careful trial, could say that they had not experienced any trouble with the reduction mills. No iron roller made would they use in place of the Jonathan Mills reduction system. Mr. Jewell surely has had ample experience, and is well capable of judging, more especially when they are turning out now over 600 barrels of flour per day, which is placed among the leading houses in the trade, and is supplied to many of the best families in New York, Brooklyn, and the adjacent cities, and speaks volumes as to its quality. To sum the matter up, the verdict of all first-class millers is, that the reduction system employed at the Brooklyn City Mills cannot be beat.

So let our friends, both East and West, acknowledge that New York and Brooklyn are well able to hold their own, notwithstanding there are only "fifty run of stones in the two cities."—*N. Y. Produce Exchange Bulletin*.

American but Odd.

THE PEOPLE OF THE HATTERAS BANKS, NORTH CAROLINA.

The *Raleigh News and Observer*, says: "The people of this region are of an amphibious nature, and live so much on and in the water that most of them, I am sure, are web-footed. They live mainly on fish, clams, oysters, crabs, terrapins and wild fowls. When they leave home they go in a boat, and whether they go to court or go courting, or to trade or to mill, or to a funeral, they always go by sail. Their corn-mills are run by sails, and some of them pump their water with windmills. They don't go up-stairs, but 'go aloft,' and when they go to bed they 'turn in,' when they are ill they are 'under the weather,' and when in robust health they say they are 'bung up and bilge free.' They speak of a trim-built sweetheart as 'clipper built.' If she is a little stout they say she is 'broad in the beam,' or she is 'wide across the transom.' Many of them have ships' cabin doors in their houses, that slide on grooves, and to their buildings they give a coating of tar instead of painting them. The 'old woman' blows a conch shell when dinner is ready, and they measure time by 'bells.' Their babies are not rocked in cradles, but swung in hammocks. They

chew black pig-tail tobacco, and drink a wild tea called 'Yeopon.' They manure their land with seagrass, and bury their yam potatoes in the sad-hills. When they want a doctor they hang a red flag against the hill-side as a signal of distress. If he don't come, because the 'wind ain't fair,' they take a dram of whisky and copperas, soak their feet in sea water, 'turn in,' and trust to luck. If they die, they will be buried on the top of a sand-ridge, and when you see several sail-boats on the water in procession, with a flag at half-mast, you are looking at a funeral.

"They ornament their houses with whales' ribs and jaws, sharks' teeth, swordfish snouts, devilish arms, sawfish swords (six feet long), miniature ships, camphor-wood chests, Honduras gourds, spy-glasses, South American lariats, war-clubs from the Mozambique Islands, Turkish pipes, West India shells, Sandalwood boxes, Chinese chessmen, Japanese faces, Madagascar idols, Australian boomerangs, and other strange, outlandish things. Their hogs are raised on clams, mussels, offal of fish and garbage, and their cattle wade out on the shoals for miles, where the water covers their backs, to feed on sea-grass, and if they are carried up-country, and fed on corn and fodder, they will not live.

"Every man is captain of some kind of a boat, and 'she' is always better than any other boat in some way. 'She is hard to beat in a gale of wind,' or 'before the wind,' or 'beating to windward,' or 'with the wind on the beam,' or 'she can sail closer to the wind,' or 'she will carry sail longest,' or 'hard to beat in the wind,' or 'totes more stock,' or is 'stronger,' or 'drier,' or 'bigger,' or 'she is a big little boat,' or 'draws the least water,' or 'needs less ballast,' or 'she is the newest,' or 'has the best timbers,' or 'steers the best,' or 'she is a lucky boat,' or 'stands up better,' or 'needs less sail than any other boat,' or 'she is best for fishing,' etc. Perhaps 'she comes about better than any other boat.' She is bound to have something about her better than any body else's boat."

Mr. Charles Brush, the electrician, has completed a new invention at his establishment in Cleveland, Ohio, for storing electricity. The design consist of a battery in the same sense as is Plante's and Faure's, but Brush's details are entirely different from those of the French inventors and do not infringe upon the rights of either of those gentlemen. Mr. Brush uses for his storage reservoir metal plates, so arranged that they are capable of receiving a very large charge of electricity and of holding it for an indefinite time. The storage reservoirs vary in size as desired, may be transported from place to place and used as desired. Each citizen may then run his own electric light as he pleases. The plates can be put on street-cars, connected with the axles, and made to run the cars without horses. Steam cars may be ultimately run in the same way. The practical character of the invention is settled, and it is simply a matter of expense. The details of the methods cannot now be made public, but will be published in a very short time.

THE following parties have lately fitted up their mills with new cleaning machinery and have put in the Becker wheat brush made by the Eureka Manufacturing Company, Rock Falls, Illinois: Wm. Pollock, Slater, Mo.; W. H. Bruns, Woodville, Ohio; B. M. Irwin, Albion, Mich.; G. Merriweather & Gilman, Clarksville, Tenn.; Barney & Killy, Sandusky, Ohio; Wm. Krause, Slaton, Mo.; S. S. Towner & Son, Byron Centre, Mich.; F. S. Coggsall, Havana, Ill.; G. & W. Todd & Co., St. Louis, Mo.; Frank LaCrosse, Pelican Lake, Minn.; Mr. Pollock, Mexico, Mo.; Nordyke & Marmon Co., Indianapolis, Ind.

A FRENCH journal has lately published a table showing that the average wages in fifty-one distinct trades were only 60½ cents a day, or \$3.63 a week. These were the wages of men. For women the average in eleven trades is 31½ cents a day, or \$1.87½ a week. Decorative sculptors, a class of highly-skilled and intelligent workmen, only receive 92½ cents a day. Such workmen here would probably earn from \$4 to \$5 a day.

AN Iowa farmer cut open an old hornet's nest, just to examine the inside arrangement. He says he thinks he will be able to see his barn in about two weeks.

JOSH BILLINGS says: There is a great deal of religion in this world that is like a life-preserver, only put on at the moment of immediate danger and then half the time put on hind side before.

Rice Mills in Burmah.

The rice trade may be fairly called the most important, and perhaps the most lucrative trade in Rangoon; there being no fewer than eighteen firms engaged in cleaning rice, while four new mills are being built.

With the exception of three at Kemendine, and one at Dalla, all these mills are situated at or near the Poozoundoung creek, which is the great market for paddy. The paddy brought to Rangoon is divided into three principal kinds known as Ngatsaing, Nghchouk, and Boyoot. Of these the Ngatsaing paddy is by far the best; it has large broad grains, dark in color with a fine pearly kernel. The Nghchouk has light colored grains, long and narrow; often the husks are only partly filled, which makes it less profitable to mill than the Ngatsaing paddy. The Boyoot has small grains, in appearance like Ngatsaing, only smaller, and has a beard like barley. The Burmese prefer the rice made from Boyoot paddy to any other.

The paddy is always sold by measure at so much per 100 baskets. A basket is supposed to contain fifty pounds weight of paddy, and should be fifteen inches diameter by fifteen inches deep. The price per 100 baskets varies from Rupees 90 to Rs. 120; generally it is about Rs. 95. The paddy is measured by Burmese measuremen, who are paid so much per hundred baskets by the boatmen; but the former are appointed by the mill-owner, who sometimes exact a certain proportion of the earnings as payment for the privilege. During spring tides, when paddy is plentiful, the boats generally come direct to the mills to sell their paddy; but when paddy is scarce, the boats are met some distance up the river by cargo boats, and the paddy when purchased is transferred to the cargo boats, and by them brought to the mills. In all these transactions Burmese brokers are employed, and paid so much for every hundred baskets of paddy they obtain.

Now, to understand how the paddy is made into rice, let us suppose that a boat of paddy has arrived at the mill, and follow it through the different processes. After being measured by the measuremen, it is carried by coolies into the godown, or, if the paddy is coming in slowly, directly into the mill. At the commencement of the year, these coolies contract to land all paddy for that year at so much per hundred baskets. The paddy having been emptied into a hopper in the lower floor of the mill, is, by means of an elevator, lifted to the top story of the building, where it is generally sifted either in a reciprocating or revolving sifter to free it from any dust, stones, sticks, &c., which may be mixed with it; sometimes this preliminary sifting is omitted, but it should always be done, as it greatly saves the millstones. After being sifted, the paddy passes through wooden pipes to the hulling stones on the floor below, for the purpose of getting the husk removed. Till lately this operation consisted of passing the paddy between two circular pieces of hard gritty stone, about four feet six inches in diameter, and about four or five inches thick, the bottom stone being fixed, while the top one, being suspended by a rynd on the top of the spindle, revolved over the bottom or fixed stone, at a speed of about 200 revolutions per minute. The paddy being run into a hole about one foot in diameter in the top stone, found its way between the two stones, and before escaping at the edges, most of the grains thus had the husk removed. Within the last three years, however, a great improvement on the old plan has come into use, which, although not at all popular at first, has now proved itself to be far superior to the old method in every respect. It is much cheaper in first cost, turns out a larger quantity of rice, and much better quality, and gives much less trouble, as it will run for three or four weeks without attention, whereas the old stones had to be dressed every three or four days.

In the new plan the stones are replaced by cast iron disc, and instead of the bottom stone being fixed and the top one made to revolve, the reverse is the case, for the bottom stone revolves and the top one is fixed. The bottom disc being firmly secured to the spindle is much more steady in its action than the old-fashioned plan where the top stone merely rested on the spindle, and depended entirely on its own weight for steadiness. The working surfaces of these are covered with a layer of a sort of artificial stone known as Carbutt's cement, which consists principally of a mixture of emery powder and magnesia, applied in a soft state; when dry, it forms a very hard durable material much superior to stone, which indeed it excels in every respect but one, viz., that it is affected by damp and is apt to warp

and come off, if not protected and kept warm when not in use during the rains. The surface of the stones used in hulling rice are flat, not grooved as in millstones for making flour. In passing between the two stones, the husk of the paddy is rubbed off, and the rice and husk come out at the edges. This is next carried to the top of the mill by means of another elevator, and passed over a winnowing machine to remove the husk. The winnowing machines usually consist of three sets of revolving fans, placed one above the other, the rice passing in front of each; any rice which may be blown out is collected and passed over another set of fans.

The rice after coming from the fanners, is what is known as "five part" or "cargo rice." It consists of rice supposed to consist of five parts of rice to one of paddy, and contains a little broken rice. In some mills this is removed by sifting, but since the introduction of the new hulling stones, the proportion of broken has been so much reduced as to make it hardly worth taking out. The rice, if intended to be shipped as cargo rice, is next run into a hopper which opens into the bagging shed, where it is weighed into bags of 225 lbs. or 230 lbs. each; these on being removed from the scales are examined by the party for whom the rice is being milled, and, if not rejected, are sewn up. The sewing is generally done by Burmese women and girls, who are paid so much per 100 bags. The bags if not intended for immediate shipment, are now removed to a go-down and stowed away; this work is done by coolies who contract by the year to stow away and ship into cargo boats when required at so much per 100 bags. Thus much for cargo rice in which the operations are few and simple. Not so, however, in making white rice, i. e., removing the inner skin of the grain and making it fit for table use.

If the rice is intended for white rice, instead of running down to the bagging shed after being winnowed, it is again elevated to the top floor of the mill, where it is passed through two, three, or even more sifters to remove as much of the paddy as possible. The sifters used in this operation are generally reciprocating, and the wire netting of different degrees of fineness. After leaving the sifters, the rice passes to the white rice stones, of which there are two kinds in general use. One kind, perhaps the more used of the two, consists of a conical drum of wood or iron about three feet deep and five feet diameter at the top, and four feet nine inches diameter at the bottom; this is fixed on a vertical spindle. The sides of this drum, or stone, as it is called, are covered with the Carbutt's cement before described. Round this drum and fixed concentrically with it is a framework of wood or iron to which is fastened a fine network of steel wire; this forms a "casing" which is "set" to leave a space of $\frac{1}{2}$ inch to $\frac{3}{4}$ inch between the stone and the network all round. This outer drum or "casing" is a fixture, but the stone revolves inside it at a speed of about 200 revolutions per minute. The rice is fed in on to the top of the stone, and, finding its way down between the stone and the casing, is spread out and rubbed as the stone revolves, the skin, in the form of dust, escaping through the network and the rice getting out below. This operation is generally repeated twice, to bring the rice to its proper degree of whiteness. The other description of white rice stone is much the same, only the stone is made about eight feet in diameter, while not more than twenty inches deep, and parallel instead of conical, and on the whole this appears to be the best. The wire netting only lasts a short time and is the most expensive item in working white rice stones. Some parties have tried the plan of making the casings of alternate segments of Carbutt's cement and wire netting, and even leather has been tried, but it is believed that this plan causes more rice to get broken, though it makes the stones more easily driven. White rice stones require great power to drive them, probably not less than from 120 to 150 indicated horsepower each. Generally, a mill will make about 500 bags of white rice per day, while of cargo rice, with twelve hulling stones, from 2,500 to 3,000 bags can be made per day. The white rice, after leaving the second stones, is again elevated to the top of the mill, and sifted to remove the broken grains, which generally amount to from ten to fifteen per cent. This broken rice is winnowed and bagged separately. The whole rice is then passed through another sifter to remove any grains of paddy which may be left in it. It is next passed over a winnowing machine to clean it from dust, and bagged.

White rice is generally known by three qualities, 1st and best, Europe; 2nd, Straits; 3rd,

Bombay. The quality depends on the degree of whiteness, the kind of paddy from which it is made, and the amount of "broken" which it contains. In some mills the rice before being bagged is passed through a polisher of sheepskin to smooth the surface and give it a pearly appearance. The dust or skin of the rice, which passes through the casings of the white rice stones, is sifted to remove any broken rice it may contain, and is then sold for feeding cattle, pigs, &c., and, by the Burmese, for curing fish. It appears to be the most nutritious part of the grain, and generally fetches from Rs. 20 to Rs. 45 per 100 baskets. In making white rice, a considerable amount of skill is required in getting the necessary whiteness without breaking too much. The engines employed in driving the rice mills in Rangoon are with a single exception horizontal and generally arranged to work condensing or non-condensing; in most of the large mills the compound principle has been introduced.

The husk of the paddy after being removed by the farmers has been and in most mills still is run into the creek or river by means of a shoot in order to get rid of it. For some few years past attempts have been made to utilize it for generating steam, but till lately they have met with only partial success in practice. Of late, great improvements in the use have been made, and it probably will not be long before it is universally utilized. The great difficulty in burning paddy husk is not the trouble of getting it to burn, but of getting the ash removed from the fire. The first attempts attended by anything like success were made by Mr. C. R. Cowie, whose apparatus was at first a modification of the "Regenerative Gas Furnace" invented by the famous Mr. Siemens, in which the fuel is first converted into gas and then burnt by mixing it with air. But after an explosion of gas, by which Mr. Cowie himself was injured, the gas principle was abandoned, and the more manageable plan of burning the husk on a grate inclined at an angle of about 45 deg. was adopted. In this apparatus, for which Mr. Cowie holds two patents, the fresh husk is fed by a hopper into the furnace at the top of the slope, and as it burns it slides to the bottom and is there raked away. This apparatus was erected and tried at several mills, but owing to proper precautions not having been taken in protecting with brickwork the fronts of the boilers from the impact of the fierce flame many boilers were burnt, and the mill-owners having taken a scare, the apparatus was condemned and discredit brought on a deserving invention. Since that time Mr. Cowie has employed egg-ended boilers where his apparatus is used, and probably from this cause alone his invention seems to have made little or no headway. The small proportion, and inefficiency of heating surface, compared with the weight and bulk of egg ended boilers, together with the large quantity of water they contain, must always place them far lower in the scale of efficiency than boilers of either the Cornish, Lancashire, or multitubular types. Besides high pressure seem now to be the rule, and, to save weight, it is of course desirable to keep the heating surface as large as possible in proportion to the bulk of the boiler.

Shortly after Mr. Cowie's patent was taken out, two other plans of burning husk were patented, viz., that of Mr. Leybourne, of Messrs. W. Strang, Steel & Co., and that of Mr. Pitt, of Messrs. Mower, Burn & Co., Dalla Rice mills; but as both of these employ inclined grates set at an angle of about 45 deg., Mr. Cowie considers them to be infringements of his patent, and Mr. Leybourne has submitted to him, while about the other the question is still pending. Mr. Leybourne's patent consists in using inclined grates set like the capital letter V inverted inside the flue of either a Cornish or a Lancashire boiler. The husk has to be shoveled in by hand, and the ash is raked away at the bottom of the two slopes. So far as generating steam is concerned it seems to give good results, but the great labor in firing which has to go on incessantly, is the great obstacle to the success of this or any other plan by which the husk has to be thrown by hand into the furnace. In Mr. Pitt's patent there are two inclined grates set like the letter V under a Lancashire boiler; the husk falls into the furnace at the top of each slope through a space left for the purpose between the grate and the boiler. The two inclined grates do not meet at the bottom, but are about ten inches apart; and under them, so as to form a trough, is an arrangement of revolving grates, by turning which the ash is allowed to fall through into a wagon placed to receive it, and is then thrown into the river. This plan seems to have been pretty successful, but is objectionable on account of the fire

being placed under the boiler so that the greatest heat strikes the shell and causes great risk of burning. This indeed once took place at Messrs. Mower, Burn & Co.'s mill, where one of the shell plates was burnt and a disastrous explosion was narrowly escaped.

A great improvement, which, however, has not been patented, was made on this apparatus by Mr. Coath, who, in order to avoid the objection of firing the shell of the boiler, built a fire-brick chamber at one end, and placed the inclined grates inside this chamber. The top is formed by a fire-brick arch, and the husk is fed into the furnace through a number of holes in the arch, about four inches square and six inches apart, arranged so as to deliver the husk on to the top of each inclined grate. This furnace is the most successful which has yet been used. Its success, however, is mainly due to the use of the fire-brick arch; for after the fire has been burning a short time, the bricks become a white heat, the radiation from which at once ignites the fresh husk as it comes into the furnace, and so entirely prevents the fire from burning dull though being smothered with fresh husk; for this reason the fire-brick chamber seems essential to success. Mr. Coath also employed a multitubular boiler like a locomotive boiler without the fire box, the only heating surface being the tube through which the flame passes once and then up the chimney. This boiler is seven feet in diameter and eight feet long, and contains 250 tubes, two-and-a-half inches diameter outside. It gives as much steam at 100 pounds pressure as a Lancashire boiler seven feet diameter and twenty-five feet long does at 60 pounds pressure. For burning paddy husk this boiler possesses many advantages; for, by splitting up the flame, as is done in passing through the tubes, more heat is utilized and little passes into the chimney. Besides, the metal of the tubes being very thin allows the heat to pass through more freely than through a plate. The first cost and freight of a boiler of this description is very much less than for a Lancashire boiler of equal power, and where fresh water can be always obtained these boilers give no trouble; but where river water has occasionally to be used they are not to be recommended. Boilers like this, but fired under the shell, have been in use at Messrs. Gerber & Chrestien's mill at Poozoundoung since the mill was built, and appear to be very efficient. This year Mr. Murdoch, of Messrs. Rowet & Co., has erected a furnace, for which he has obtained a patent. He uses a fire-brick chamber, built in front of the boiler, and flat grates; the husk is fed into the furnace through holes in the arch, in the form of a shower, and becomes ignited as it falls, the ash being discharged through doors in the bottom which may be opened at pleasure. From the highly satisfactory results obtained and the elaborate manner in which Mr. Murdoch is carrying out his ideas, it is probable that, as a thoroughly practicable and manageable plan, this will surpass all the others. If this plan of using a fire-brick chamber and holes to feed the husk thoroughly were adopted in Mr. Leybourne's patent the firing difficulty would have been overcome and probably as good results obtained as any other.

The mills of Rangoon are generally managed by engineers, who are as a rule well paid, and, considering the important and somewhat arduous nature of their duties, this is necessary. Some firms employ a miller in addition to an engineer, but this plan can hardly be considered as good as having an extra engineer; for, after becoming acquainted with the milling, the one can take the other's place,—a very important matter in the busy season when night work has to be done. The mills generally start at daylight, and, all going well, continue working till nearly dusk. The laborers are nearly all natives of India, the firemen, engine drivers and mill men who have anything to do with machinery are generally from Chittagong, and the stone dressers, paddy coolies and boatmen from the Madras coast. On the whole they are well paid, the firemen getting from Rs. 18 to Rs. 25 per month, the engine drivers from Rs. 35 to Rs. 50, and the stone dressers from Rs. 20 to Rs. 40, while ordinary mill men get from Rs. 14 to Rs. 18 per month; all are provided with houses. Many of the mills are built of brick, but of late years iron and timber have become more common. Unless the mill owners intend to ship the rice themselves, the rice is generally sold before it is milled, nearly all business being done by contract.—*Journal of Applied Science.*

We respectfully request our readers when they write to persons or firms advertising in this paper, to mention that their advertisement was seen in the UNITED STATES MILLER. You will thereby oblige not only this paper, but the advertisers.

NEWS.

EVERYBODY READS THIS.

ITEMS GATHERED FROM CORRESPONDENTS, TELEGRAMS AND EXCHANGES.

Pillsbury A mill is again running.

Elias Gay has sold his mill at Osseo, Wis.

DEAD.—N. K. Elliott, miller, at Jackson, Mich.

DIED.—John Safford, the miller at Morrisville, Vt.

BURNED.—Hiram Smith's mill, at Harrisburg, Oregon.

BURNED.—Heminway & Barclay's mill at Lansing, Iowa.

BURNED.—Hilyard Bros' mill, at Portland, New Brunswick.

Edward Evans has rented E. M. Robert's mill at Bangor, Wis.

Crother & Co. have purchased H. B. Bateman's mill at Ripon, Wis.

BURNED.—Long & Porter's mill at Edmore, Mich. Partially insured.

BURNED.—Wm. J. Thompson's mill at Potter's Mills, Pa. Loss 10,000.

J. G. Hoyt & Son's mill burned recently. Loss \$4,000. Insurance \$1,000.

BURNED.—Stout & McCey's mill, at Mid-delbourn, Guernsey Co., Ohio.

H. C. Watson & Co. have sold their mill at Greeley, Colo., to James Graham.

BURNED.—F. A. Hurt's mill at Germantown, Tenn. Loss \$12,000. Insurance \$2,000.

The dry weather has caused most of the water power mills in Virginia to shut down.

The Northwestern mills of Minneapolis, are putting in two more of the Gray roller machines.

The "Crown Roller Mills" of Minneapolis, are putting in Wegmann's patent porcelain rolls.

The Minneapolis head-millers' picnic passed off nicely—About 2,000 persons attended.

The citizens of Pipestone city, Minn., subscribed nearly \$1,000 in one day toward building a mill.

The flouring mill at Cloverland, Ind., was burned on the 31st ult. Loss, \$8,000; insured for \$5,000.

Five hundred dollars has been raised toward the erection of a grist mill at Gothland, Union county, Dak.

BURNED.—Payne & Richardson's mill, at Cherry Creek, N. Y. Loss, \$5,000. Insurance, \$1,500.

BURNED.—Sept. 22, the Prairie State Flouring Mills, at Elgin, Ill., owned by O. Davidson. Loss \$10,000.

C. B. Marson, late of Augusta, Wis., has moved to Osseo, where he has rented Lindeman's 100 barrel mill.

N. G. & E. Cooley's mill at Rodman, N. Y., was recently damaged by fire to the extent of \$8,000. No insurance.

Crocker, Fisk & Co., of Minneapolis, are remodeling their mill, and putting in a number of Gray's noiseless roller mills.

Commins & Allen, of Akron, O., are running on the entire rollersystem and use throughout Gray's noiseless roller mills.

The mills in Coon Valley, Wis., which were damaged by flood a few weeks ago have been repaired and are running again.

Gibson & Co., of Indianapolis, have lately started up one of their mills on the roll system using Gray's patent noiseless rolls.

The Junction mills, at River Falls, Wis., which have been shut down two months for extensive repairs, are ready to resume business.

A. H. Kirk and W. J. Fender, of Minneapolis, have formed a co-partnership for the manufacture and sale of Dust Catchers, and other machinery.

Henderson and Benedict's feed mill at Springfield, Dak., has been shut down for a few days on account of the caving in of a part of the tail race.

W. D. Washburn, of Anoka, Minn., is increasing his capacity and putting in Gray's rolls, and a large number of porcelain rolls for finished middlings.

The Tipton mills, at Tipton, Mo., owned and run by Hanawalt & Co., have a capacity of 100 barrels per day and are kept busy by a large custom and merchant trade.

The Daniel Shaw Lumber Co., Eau Claire, Wis., are doubling the capacity of their flour mills. Ewd. P. Allis & Co., are doing the work and putting in the Gray noiseless roller mills.

The four run mill of Higinbotham, Stingley & Huntress, Manhattan, Kansas, built by the Nurdyke mill works, Kansas City, Mo., has lately started up and is doing a prosperous business.

John Galbraith is proprietor of the Tollendal mills, at Allandale, Ont. The mill is driven by both steam and water power, and has a capacity of 100 barrels per day. The mill is doing a fine business.

John Hurd is rebuilding his mill at Marshall, Mich., and will make all his wheat reductions on Gray's patent noiseless roller mills, and grind his middlings on Wegmann's patent porcelain rolls. Ewd. P. Allis & Co., of Milwaukee, have the entire job.

The Atlas Engine Works, of Indianapolis, Ind., have placed one of their Standard slide valve engines in the Cincinnati Exposition. It makes 235 revolutions per minute, furnishing power for electric lighting, and shows a remarkable result for regularity of motion, and perfect running.

Ewd. P. Allis & Co., have just shipped a superb 800 horse power Reynolds-Corliss compound condensing engine to the LaGrange Mill, of Red Wing, Minn. This mill has lately increased its capacity by putting in a lot of Gray's patent noiseless roller mills, which necessitated an increase in power.

The New York City Roller Flour Mill, now nearing completion, is a model flour mill. It is located on Broom & Lewis streets, and is a six-story structure. The power requisite to operate the entire machinery of the mill is from a high pressure engine, 36 feet long, 70 tons weight, 650 horse-power, built by the eminent Corliss, of Providence, and which employs 7 tubular boilers to furnish it steam. The fly-wheel is 25 feet in diameter, and weighs 25 tons. On the first floor there are 61 roller machines, and the floors above contain other machinery, including 58 middlings purifiers. There will be in use some 50,000 feet of belting, the main belt being 80 feet long and 40 inches wide. For elevating the grain, some 10,000 buckets will be in use. The power to run the rollers will come direct from the engine shaft, by means of spur gears 11 feet in diameter and 18 inches face, while the other machinery will be driven by the main belt above named. The company will have a storage capacity for about 25,000 barrels of flour, exclusively of storage for wheat and feed.

Items of Interest.

A MILL owner had the right to use the waters of a creek to run the mill machinery, and he made a dam across the creek to create a pond which he leased to certain persons to cut ice, and undertook to keep the dam safe and at a certain height. The ice men broke their contract, but still took out the ice, and the mill owner sued them for the value of the ice taken. In this case, Dyer vs. Curtis in the Supreme Court of Maine, decided on April 5, Judge Symonds, in his opinion, said that the plaintiff could not recover, since he had no right to the use of the water to make the pond; that he, by making the dam, had obstructed navigation, and had created a public nuisance, and, therefore, the lease was illegal and void.

A PROCESS has been perfected by Messrs. Krupp, of Essen, Germany, which, it is said, will lead to a material reduction in the expenditure on ordnance for the German army and navy. All the heavier Krupp guns consist of a steel body strengthened by hoops, the 30½ centimetre guns having three tiers of hoops: the 26 centimetre and 24 centimetre, two, and the remainder one tier. The interior of the body, or the bore of the gun, being the part subjected to the greatest wear and tear, becomes rapidly worn out, and hitherto it has been found necessary, after, at the very most 1,000 rounds had been fired, to melt up the whole gun on account of the damaged condition of the bore, although the outer parts of the piece were practically as good and sound as ever. Since the construction of the outer hoops is very costly, the idea occurred to one of the members of the firm that it might be possible to save the melting operation; and this it has now been found possible to accomplish by treating the body of the piece with a cold producing preparation of carbonic acid, which contracts it to such an extent that the hoops, expanded at the same time by application of heat, can be easily removed, in a condition to be again used.

A MODEL STREET CAR.—A model street car has lately been introduced on some of the street railways in Philadelphia, which is thus described by the *Record* of that city: "Perfect

ventilation has been secured by a perforated ceiling. The dome lamp is in the center, and side lights add increased brilliancy to the interior, besides dispensing with the obnoxious smell of oil. The windows are quite large, and, besides having a patent anti-rattling attachment, are so arranged that, when desired, they can be opened to an extent that practically makes an open summer car. The platforms are made very low purposely to accommodate children and ladies. The conductor can be signalled by the passenger without rising from his seat. Above the driver's head, suspended by pivots from the roof, is a mirror set at an angle, giving him a full view of the interior. The conductor is also provided with a mirror, enabling him, by standing with his back to the door, to keep a lookout for passengers in and out of the car. Each car has a contrivance entirely novel, for preventing accidents to horses which might fall down and be exposed otherwise to injury, by being dragged beneath the car. Another arrangement in front of the wheels is designed to save human life. A further device relieves the horses from all the strain in starting, and above all, the springs and spring-bed are of a new pattern, permitting the car to turn curves as on a pivot without a jar or noise."

HENRY SMITH, JR. GEO. G. SMITH. F. A. SMITH.

SMITH BROS., Practical Millwrights

Plans, Specifications and Estimates made for all kinds of

Millwork, Machinery, Etc., Etc., Etc.

Flour, Sawmill, Tanners' and Brewers' Machinery, and General Mill Furnishers.

454 Canal St.,

MILWAUKEE, WISCONSIN.

[Mention this paper when you write us.]

IMPORTANT NOTICE TO MILLERS.—The Richmond Mill Works and Richmond Mill Furnishing Works are wholly removed to Indianapolis, Ind., with all the former patterns, tools, and machinery, and those of the firm who formerly built up and established the reputation of this house; therefore, to save delay or miscarriage, all letters intended for this concern should be addressed with care to Nurdyke & Marmon Co., Indianapolis, Ind. [Mention this paper when you write us.]

FOR SALE.

We, the undersigned, offer for sale on most favorable terms our Custom, Flouring and Oat Meal Mills, located at Geneva, Walworth County, Wisconsin, together with an unfailing water power from Geneva Lake. All said mills are now in full repair and good working order. Said water power is in complete order and is at all times easily managed and controlled. These mills have a large custom work. The reason for this sale is the ill health of a proprietor.

GILBERT & BARBER, Proprietors,
Geneva, Walworth County, Wisconsin.

MILL FOR SALE.

This mill is new and in good repair, situated on the Big Blue River, 6 miles north of Beatrice, Neb.; is a three-story frame building, 26x30 feet; 4 run of stone; 66-inch Improved Turbine Water Wheel. This mill must be sold within the next 90 days. Enquire of JOHN ROBERTSON, Assignee, Beatrice, Neb.

Situation Wanted

Either in Merchant or Custom Mill—Merchant preferred. Have had two years' experience in Custom Mill. Wages not so much an object as learning the trade. Address "M. C." care United States Miller, Milwaukee, Wis.

I Want to Rent

The whole or half of my Mill at this place. It is a water-power mill, in good condition, with capacity of about 25 barrels per day. No other mill in the township. Address for further particulars,

WILLIAM REDDEN,
Greeley, Delaware County, Iowa.

MILL FOR SALE.

Enon Valley Mills, with 3 run of stone in good running order on the Pittsburgh & Fort Wayne R. R. Shipping facilities good. Address MILLER & MARSHALL, Enon Valley Lawrence Co., Pa.

"THE GREAT ROCK ISLAND ROUTE"

Calls your attention to the following REASONS WHY, if about to make a Journey to the GREAT WEST, you should travel over it:

As nearly absolute safety as is possible to be attained. Sure connections in UNION DEPOTS, at all important points. No change of cars between CHICAGO, KANSAS CITY, LEAVENWORTH, ATCHISON or COUNCIL BLUFFS. Quick journeys because carried on Fast Express Trains. Day cars that are not only artistically decorated, but furnished with seats that admit of ease and comfort. Sleeping cars that permit quiet rest in home-like beds. Dining cars that are used only for eating purposes, and in which the best of meals are served for the reasonable sum of seventy-five cents each. A Journey that furnishes the finest views of the fertile farms and pretty cities of Illinois, Iowa and Missouri, and is afterwards remembered as one of the pleasant incidents of life. You arrive at destination rested, not weary; clean, not dirty; calm, not angry. In brief, you get the maximum of comfort at a minimum of cost.



That the unremitting care of the Chicago, Rock Island & Pacific Railway for the comfort of its patrons is appreciated, is attested by its constantly increasing business, and the fact that it is the favorite route with delegates and visitors to the great assemblies, political, religious, educational and benevolent, that assemble from time to time in the great cities of the United States, as well as tourists who seek the pleasant lines of travel while en route to behold the wonderful scenes of Colorado, the Yellowstone and Yosemite. To accommodate those who desire to visit Colorado for health, pleasure or business, in the most auspicious time of the year, the Summer season and months of September and October, the Company every year puts on sale, May 1st, at all coupon ticket offices in the United States and Canada, round trip tickets to

DENVER, COLORADO SPRINGS AND FUEBLO.

At reduced rates, good returning, until October 31st. Also to San Francisco, for parties of ten or more, good for ninety days, at great reduction from regular fares.

REMEMBER, this is the most direct route for all points WEST and SOUTHWEST. For further information, time-tables, maps or folders, call upon or address

R. R. CABLE,
Vice-Pres't and Gen'l Man'gr, Chicago.

The "Nonpareil" Mill Pick Co., Manufacturers and Dressers of MILL PICKS



We use the best quality of double-refined English Cast Steel. We have had thirty years' experience and guarantee satisfaction. Our product speaks for itself. Our Picks are equal in quality to any made, and are excelled by none. Can furnish testimonials by the hundred from millers in all parts of the country. To responsible parties we give thirty days' trial, and if we do not give entire satisfaction we will pay express charges to and from Chicago. Send for our latest Circular and Reduced Price List to

O'CONNELL & MAHONY,
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MEDAL & PREMIUM AWARDED TO
ALCOTT'S
Turbine Water Wheels
Most Perfect Turbine in Use.

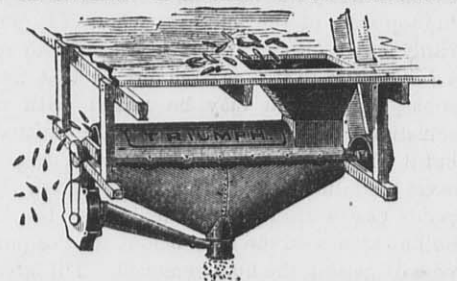
ALCOTT'S IMPROVED TURBINE WATER WHEEL.

MANUFACTURED BY
T. C. ALCOTT & SON,
MOUNT HOLLY, N. J.

MANUFACTURERS OF
Circular Saw Mills, Shafting, Pulleys,
Hangers & General Mill Machinery,
and Stating Particulars of Stream, &c.
Address: T. C. ALCOTT & SON,
Mount Holly, N. J.

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TRIUMPH POWER CORN SHELLE!



Shells and Cleans 2,000 Bushels Ears per day. The Cheapest, Best and most Simple Power Corn Sheller in use. Send for Circular and Price List. HULBERT & PAIGE, Painesville, Ohio.

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Made entirely of STEEL.
STEEL CAR
ONE MAN with it can easily move a loaded car. Will not slip on ice or grease.
Manufactured by
E. P. DWIGHT,
Dealer in Railroad Supplies,
407 Library St., Philadelphia, Pa.

[Mention this paper when you write us.]

FOR SALE.

A good water power and mill with two run of stone at Stone Bank, Waukesha County, Wis. Mill is doing a good business, which with a moderate amount of improvements could be largely increased. One half or the whole will be sold to the right party. For full particulars address U. S. MILLER, Milwaukee, Wis.

A GRADUAL INFLATION MILL.

Mr. B. Walton, of Fairbury, Ill., substituted a chest of Slater reels for one of the old pattern last November, which enabled him to increase the output of his mill about 30 barrels per day. He has just ordered another four-reel chest of the same kind to take the place of a two-reel chest now in the mill. When he gets this chest in he will be able to turn out 175 barrels a day, doing the work on eleven reels. Mr. Walton's is not a gradual reduction mill. It is a gradual inflation mill—in that it inflates his bank account, which is much better for the health and comfort of the proprietor. It will pay you to investigate the merits of the Slater reel. Address,

C. B. SLATER & Co.,
Blanchester, Ohio.

Northwestern Mill Bucket Manufactory

310, 312, 314 FLORIDA STREET.



Is furnishing Mills and Elevators in all portions of the Country with their superior BUCKETS. They are UNEQUALLED for their SHAPE, STRENGTH AND CHEAPNESS. Leather, Rubber, Canvas Belting and Bolts at lowest market rates. We have no traveling agents. Sample buckets sent on application. Large orders will receive liberal discounts. Send for sample order. Address all inquiries and orders to
L. J. MUELLER, 197 Reed St., Milwaukee.
[Mention this paper when you write us.]

JOHN C. HIGGINS,

Manufacturer and Dresser of

Mill Picks,

No. 169 W. Kinzie Street,

CHICAGO, ILLINOIS.



Picks will be sent on 30 or 60 days' trial to any responsible miller in the United States or Canada, and if not superior in every respect to any other pick made in this or any other country, there will be no charge, and I will pay all express charges to and from Chicago. All my picks are made of a special steel, which is manufactured expressly for me at Sheffield, England. My customers can thus be assured of a good article, and share with me the profits of direct importation. References furnished from every State and Territory in the United States and Canada. Send for Circular and Price List.
[Mention this paper when you write us.]



Mill Furnishing,
Foundrymen & Machinists.
Established 1861.
MANUFACTURE
MILL STONES.
Flouring Mill Contractors.
Send for Pamphlet.
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Over 1,000 of these Turbines
IN USE.



It has tight shutting and easily operated Gate; gives more power for the water used, and will last longer than any other Turbine. Large shop, with improved tools for making this wheel and machinery. Illustrated Pamphlet and Catalogue with prices sent free by

N. F. BURNHAM.

[Please mention this paper when you write us.]

FLOUR MILL OWNERS!

Please answer this advertisement BY LETTER. Do not delay but answer it at once. It will take but a moment, and you will thereby serve the trade as well as yourself. It cannot but prove of value to you.

Flour Mill Owners in the United States and Canada.

GENTLEMEN: We are preparing the matter for CAWKER'S AMERICAN FLOUR MILL DIRECTORY for 1882, and would beg you to kindly furnish us by return mail with the following information:

1. The name of person or firm operating your mill, with name of your Post-office, County and State.
2. Capacity in BARRELS of flour, of mill per day of 24 hours. (If you are making improvements and increasing capacity, state what the capacity of your mill will be after your improvements are made.)
3. Do you use water or steam power?
4. If you have any special name for your mill as for instance, "Phoenix," "Oriental," "Capital," "Wild Moss," etc., please name it.
5. Are there any other flour mill owners receiving their mail at your Post-office? If so, kindly oblige us by naming ALL of them.

Upon receiving above information we shall duly insert your names with Post-office in our Flour Mill Directory. The Directory is used by the mill-furnishers, flour brokers, commission merchants and trade newspapers in this country and in Europe for the purpose of sending out their circulars, price lists, catalogues and sample papers, which will furnish you with much valuable information, which without your names in this Directory you would not obtain. If you are not already a subscriber to the UNITED STATES MILLER we invite you to subscribe. The subscription price is One Dollar a year. We desire to have the UNITED STATES MILLER a regular visitor in every flour mill in America. Do not fail to answer this advertisement immediately whether you subscribe or not. We want this, our Third Flour Mill Directory, to be as perfect as possible, therefore make your answer full and complete. We wish it distinctly understood that we make no charge for inserting your names in the Directory.

Address

UNITED STATES MILLER, Milwaukee, Wis.

THE BEST ON EARTH, AND DON'T YOU FORGET IT!

THE GLOBE MIDDLINGS PURIFIER

KING OF THE MILL.

[Patented February 1st, 1881] Manufactured by the

GLOBE MANUF'G CO., Benton Harbor, Mich.

Requires Less Power, Less Space and Less Attention than any other Purifier, and it is the Cheapest, Estimated by Work Performed.

It is THE MOST INGENIOUS AND EFFECTIVE, yet simple device ever invented for Purifying Middlings, in any temperature, from any kind of stock, and the ONLY ONE that can do

Rapid and Good Work with or without a Brush,

At the pleasure of the miller. It is a Rotating, Vibrating and Oscillating Disk, with slightly angular action of the bolting cloth that frees the meshes completely, in no way injuring the cloth; rotating over a brush, that, at the option of the miller, is adjustable for brushing with any degree of fineness desired; and it is also, while machine is running, Reversible, Removable or Stationary. So perfect is the working of the Bolting Cloth, through which the air is forced from beneath it, that it is found the BRUSH IS NOT NEEDED.

The Globe is the Easiest Running Purifier made. An Inch Belt will Run the Medium Size. Runs with an inch and a half belt in doing the work for three run of burs, while other machines, for same work, are advertised and extolled as running with a three inch belt.

The movement being rotary, there are no dead centers to overcome or use up power. The main shaft is erected perpendicularly through the cylinder or casing of machine and runs on a pivot, in a step, below the floor of the Purifier, where it receives power from a horizontal shaft. The air-exhaust-fan is under perfect control, and a strong current of air, admitted at the base of the cylinder, is forced up through the cloth and the flour; and meeting the descending middlings throws them into all the large space above the cloth, like a spray of water, almost instantly and PERFECTLY ELIMINATING ALL DUST AND EVERY IMPURITY, and proving, estimated by results, that

The Globe Middlings Purifier—King of Flouring Mills—
IS THE CHAMPION! THE BEST ON EARTH!

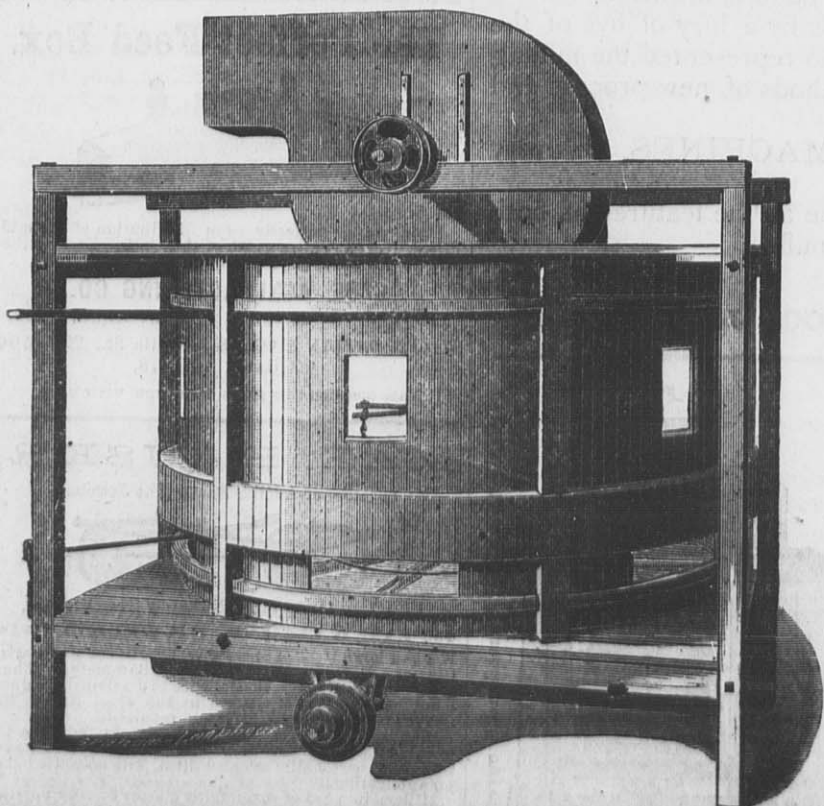
It is cheaper than any efficient Purifier. It defies competition. It is at war with Purifier monopolies. It is compact. A boy can carry it in knock down form to any part of a mill. It is complete and Economical. Meshes always open and free. The Purifier needs no attention. Can purify perfectly in any temperature any kind of middlings faster and better than any other machine on earth. IT IS AUTOMATIC, and needs no attention. IT NEVER CLOGS UP. It runs with less power, occupies less space, is more portable, does more and better work, is more simple in movement and durable in wear, and is warranted more Profitable for either Large or Small Mills than any other Purifier. The best on earth, and to prove this the Company offers intending purchasers, wanting the BEST and the CHEAPEST, to put

THE GLOBE ON TRIAL 30 DAYS WITHOUT COST

If the Purifier is not satisfactory and all it is claimed. The Centennial Mills, at La Porte, Ind., manufacture "Gilt Edge Patent Process Flour," commanding the highest price, actually without any loss of stock and with less than one per cent of second grade flour, and the only Purifier used is the GLOBE, KING OF THE MILL! The Company manufacture seven sizes. The facilities for shipping by lake or rail are superior. Numerous unsolicited testimonials will be furnished on application. Send for Price Lists and state what you need. Address

GLOBE MANUFACTURING CO.,

E. D. COOKE, Sec'y.
J. P. THRESHER, Gen'l Manager, { BENTON HARBOR, MICH., U. S. A.
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EXTERIOR VIEW GLOBE PURIFIER.

RICHMOND MANUFACTURING CO.

LOCKPORT, N. Y.,

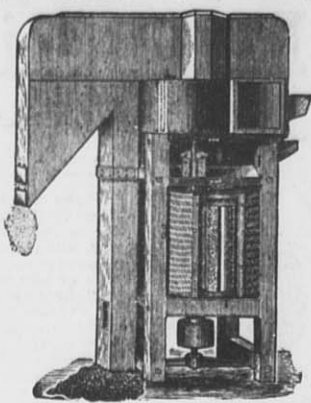
Manufacturers of
RICHMOND'S CELEBRATED

Smut Machines,
Brush Machines,
Grain Separators,
and Bran Dusters.

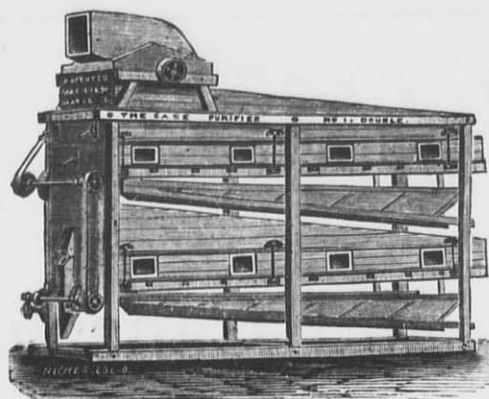
Nearly Two Hundred of these machines are now in operation in the city of Minneapolis, Minn., alone, and more than Sixty in the city of Milwaukee, Wis. They are also extensively used in many other sections, both on Winter and Spring Wheat.

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COSTS LESS AND HAS
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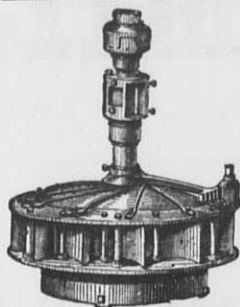
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Improved Cockle Separators,
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Also built in combination with Cockle Machine, and

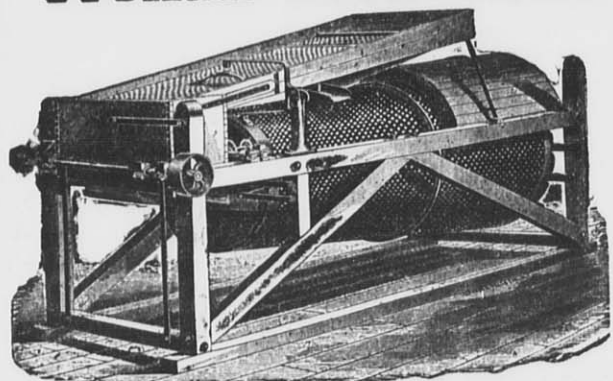
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We will contract to furnish entire Wheat Cleaning Machinery for mills and guarantee the best results.

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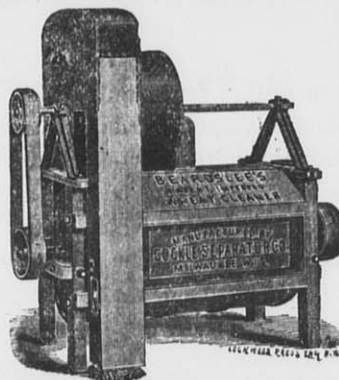
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1865.

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A compound oil, warranted better than Lard or Spermin Oil for machinery uses, and will last longer. Guaranteed not to heat or gum, and to give satisfaction when used on steps, spindles, etc.

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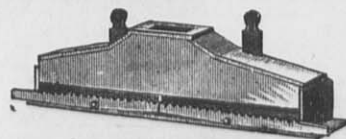
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It insures a perfectly even distribution of the middlings over the entire width of the cloth. Every miller will appreciate this. Fits all purifiers. Address

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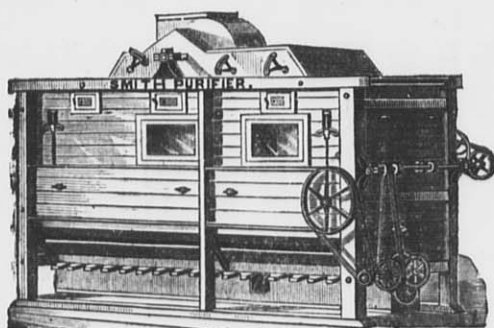
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Millers in need of magnifying glasses for any purpose can have their wants supplied at a reasonable price. Address as above.

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SIMPLE, DURABLE, ECONOMICAL. Cheaper than any other of EQUAL CAPACITY. Licensed under all patents owned by Consolidated Middlings Purifier Co. Eight sizes single and three sizes double machines.

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Was awarded THE HIGHEST PRIZE ever offered for the competition of milling machinery—THE LOCKWOOD MEDAL—at the great Exposition. Competition and comparison with every other known Purifier only established it more firmly in the esteem and approval of millers and mill-owners.

It was UNANIMOUSLY awarded the FIRST PREMIUM in its class by a jury of five of the ablest, most successful and experienced mill-owners in the United States, men who represented the milling of every variety of wheat, and the use of all the latest and most approved methods of new process and gradual reduction milling.

Our sales during the Exposition aggregated OVER ONE HUNDRED MACHINES, for every part of the country and for work on all kinds of stock.

We invite particular attention to our SPECIAL machines, combining in one all the features of both air and sieve Purifiers, perfectly adapted to handle and purify the breaks of roller mills.

Write for descriptive circular and price list to the

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Manufacturers and Sole Proprietors of the

BECKER BRUSH

Galt's Combined Smut and Brush Machine.

The Only Practical Cone-Shaped Machines in the Market, and for that Reason the Best.

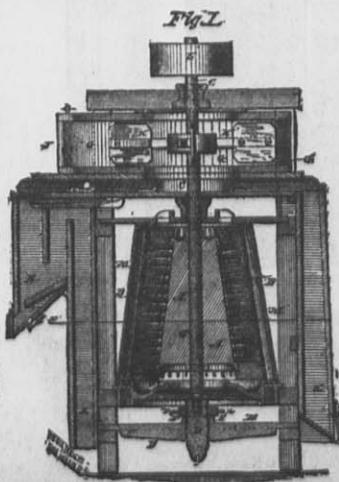
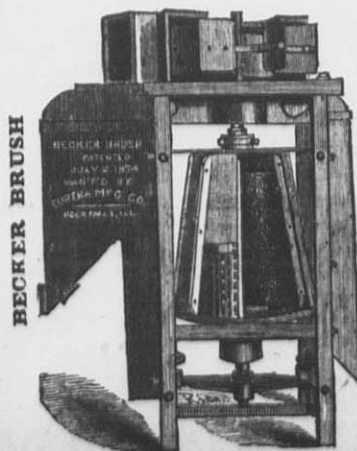
ADJUSTABLE WHILE IN MOTION.

Nearly 1,000 of these Machines in Use

In the United States and foreign countries, and so far as we know all that use them are pleased. Millers, millwrights and milling experts claim the Cone Shape Solid Cylinder Brush is the true principle to properly clean grain. All machines sent on trial, the users to be the judges of the work. For prices and terms apply to

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Galt's Combined Smut and Brush Machine.

WEGMANN'S PATENT PORCELAIN ROLLS.

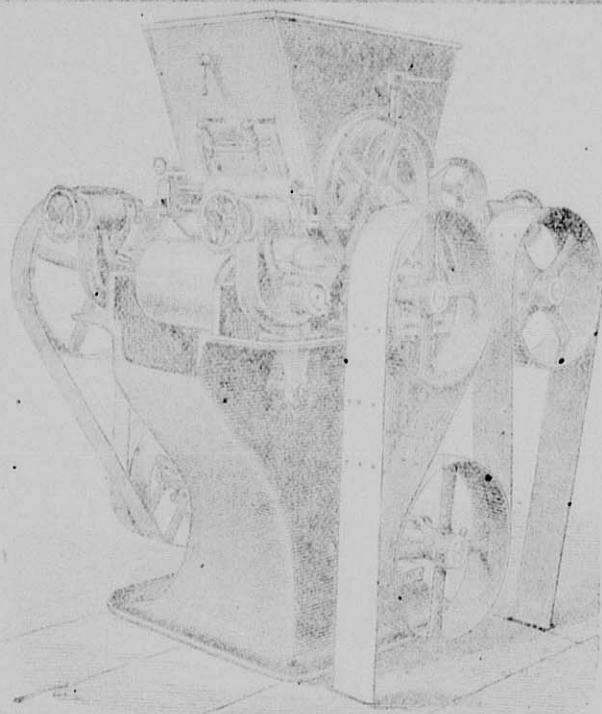
The Best Roll

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Middlings

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Awarded Special Premiums.

OVER 6,000 OF THESE ROLLS IN USE
In this Country and Europe.

These Rolls are put in Gray's Patent Frame with perfect adjustments and Noiseless Belt Drive.
Thousands of references can be given.

The Superiority of Porcelain over Chilled Iron for Reducing Middlings or Tailings is as under:

CHILLED IRON ROLLS, whether polished at first or scratched with fine grooves, soon become, through wear, smooth and glassy, and will only squeeze instead of grinding.

PORCELAIN presents a continual inherent sharpness, which no art can give to any other material in equal fineness and regularity, which enables it to act upon the smallest particles of flour and to separate them.

CHILLED IRON discolors the flour, by reason of the carbon that exudes from it, and also by its liability to rust.

PORCELAIN does NOT discolor the flour and is entirely indifferent to any and all chemical influences.

CHILLED IRON ROLLS are smooth and "pake" the meal; more especially is this the case on soft material.

PORCELAIN ROLLS possess a certain porosity, and no matter how finely ground, or how long they have been used, still retain this granular and porous texture, and will reduce the middlings without "caking."

CHILLED IRON can be cut with steel.

PORCELAIN can ONLY be cut by the best black diamonds.

CHILLED IRON ROLLS require great power to reduce middlings to the proper fineness on account of their smooth surface.

PORCELAIN ROLLS will do the same amount of work, on account of the slight pressure required, and the gritty nature of the Porcelain, with one-half the power. The flour produced by Porcelain Rolls is sharper, whiter, stronger, and more even than that produced by Iron Rolls.

No remarks need be made as to the superiority of Porcelain Rollers over Millstones, as it is a recognized fact by all. Porcelain Rollers are the only Rollers that will entirely supersede Millstones and Metal Rollers.

These Machines received the FIRST PREMIUM

At the late Millers' International Exhibition, Cincinnati.

Gold Medals at Nuremberg, 1876; Paris International Exhibition, 1878;

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Full instructions regarding the system of using Rolls in place of Stones given to parties purchasing.
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EDW. P. ALLIS & CO., Sole Mfr's,

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Electric Purifier Co.,

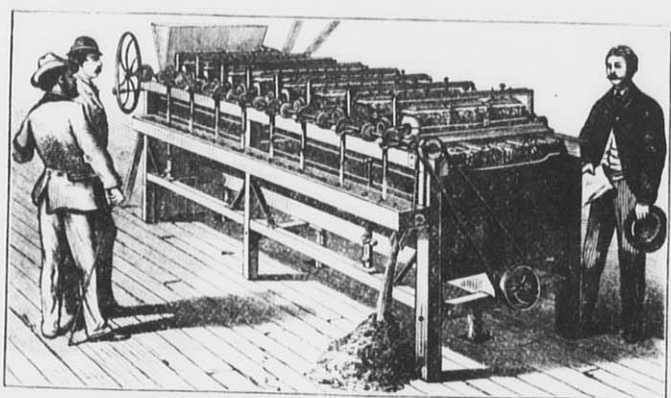
— OF —
New Haven, Conn.

Factory, New Haven.

New York Office, 17 Moore Street.

This Company was organized in New Haven on the first of March, 1881, with a Capital of \$300,000.

Electric Middlings Purifiers.



Having purchased the SMITH-OSBORNE PATENTS granted by the

UNITED STATES, GREAT BRITAIN, FRANCE, BELGIUM, AUSTRIA and CANADA,

The first Machine manufactured was put up soon after the United States patent was granted, in February 1880, in the Atlantic Mills, Brooklyn, and has been in almost constant practical use since, demonstrating beyond a question that it possesses the following advantages:

- It Purifies Middlings Absolutely Without Waste.
- It Purifies Middlings with Greatly Reduced Power.
- It Purifies Middlings with Greatly Reduced Space.
- It Purifies Middlings with Greatly Increased Rapidity.
- It Purifies Middlings from Spring and Winter Wheat Equally Well.
- It Purifies Middlings with the Best Results.
- It Dispenses with the Use of Air Blasts.
- It Dispenses with the Use of all Dust Houses.
- It Dispenses with the Use of all Dust Collectors.
- It Dispenses with the Dangers of Explosion and Fire.
- IT PURIFIES DUST HOUSE MATERIAL OF ALL KINDS.
- IT PURIFIES THE FINEST MIDDINGS OF ALL KINDS.
- It is Remarkably Adapted to Custom Mills.
- It is Excellently Adapted to Manufacture Farina.

Where the Electric Purifiers May Be Seen in Operation.

Atlantic Mills, Brooklyn, N. Y.; Archibald Schurmeier & Smith, St. Paul, Minn.; F. L. Johnston & Co., St. Louis, Mo.; Washburn, Crosby & Co., Minneapolis, Minn.; Norton & Co., Chicago, Ill.; Sanderson & Co., Milwaukee, Wis.; M. C. Dow & Co., Cleveland, Ohio; James K. Hurin, Cincinnati, Ohio; Mosely & Motley, Rochester, N. Y.; Chas. Tiedmann, O'Fallon, Ill.; Lyman & Co., Norfolk, Va.; Texas Star Flour Mills Galveston, Texas; Zenith Milling Co., Kansas City, Mo.; C. Hoffman & Son, Enterprise, Kansas; Richter & Co., Williamstown, W. Va.; Kinney & Hobart, Burrton, Kansas; Parkville Milling Co., Parkville, Mo.; Norton & Co., Lockport, Ill.; Ballard, Isom & Co., Albany Oregon; Niedhammer & Walton, Buena Vista, Ind.; Kimberly & Clark Co., Appleton, Wis.; Cyrus Hoffer, Lewisburg, Pa.; Roberts & Briggs, Seneca Falls, New York; Phillips & Thomas, Kennedy, New York; Hillsdale City Mills, Hillsdale, Mich.; Susong, Logan & Co., Bridgeport, Tenn.

SOMETHING NEW!

A Combination Electric Purifier—A Complete System of Three Purifiers in One.

Samples of work will be sent upon application, by mail, and all inquiries answered from the New York office. Parties contemplating building new mills, or reconstructing old ones, should see the superior working of the ELECTRIC SYSTEM, before making contracts for Purifiers elsewhere.

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No. 17 Moore St., NEW YORK.

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MANUFACTURERS OF THE

AMERICAN TURBINE WATER WHEEL,

Best Quality French Burr Millstones.

Sole Agents in Dayton for the sale of

DU FOUR & CO.'S CELEBRATED BOLTING CLOTHS.

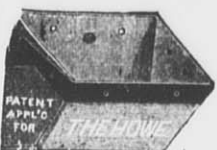
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The AMERICAN TURBINE, as recently improved, is unequalled in the power utilized from a given quantity of water, and is decidedly the BEST PATENT WATER WHEEL ever known. It has also been otherwise greatly improved.

Large Illustrated Catalogue Sent Free on Application.

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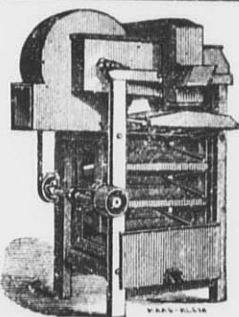
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Sole proprietors and manufacturers of EUREKA Wheat Cleaning Machinery, consisting of "Smut Machines," "Brush Machines," Separators for mills and warehouses, and Flour Packers.

Also the Magnetic Separator for removing substances from grain automatically, and dealers in the genuine Dufour & Co. and Dutch Anker brands Bolting Cloth, and mill furnishings generally.

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You can successfully purify the chop from either Stone or Rolls with the

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Satisfaction Guaranteed or No Sale.

THIRTY DAYS' TRIAL.

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BOTTLE SUPPLIES CONSTANTLY ON HAND

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